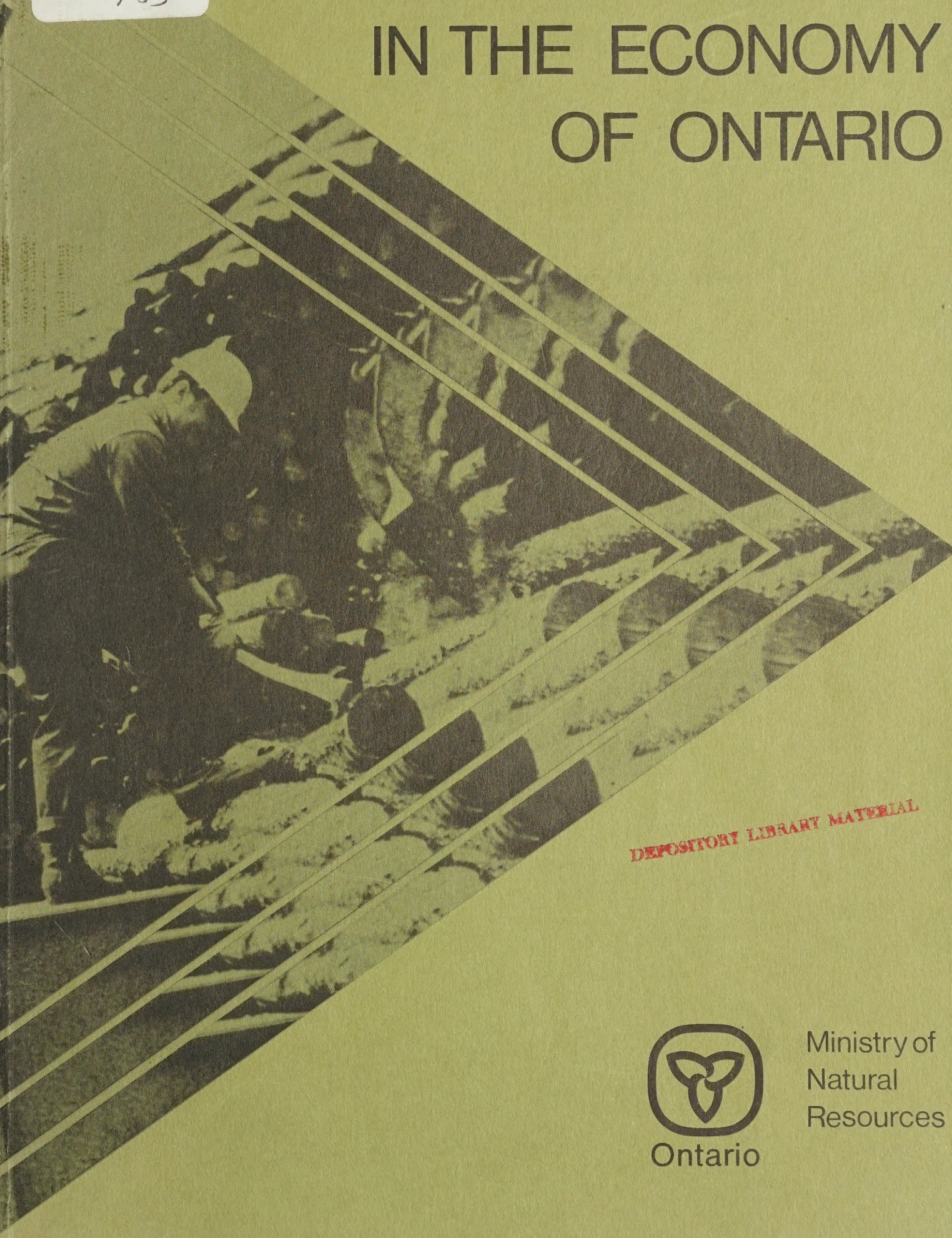
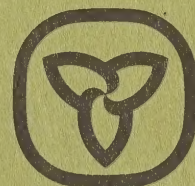


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THE FOREST INDUSTRY IN THE ECONOMY OF ONTARIO



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THE FOREST INDUSTRY IN THE ECONOMY OF ONTARIO

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THE FOREST INDUSTRY IN THE ECONOMY OF ONTARIO

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HIGHLIGHTS

The output of primary forest products has remained fairly stable in amount for approximately the past 80 years, but has undergone major shifts in composition. The shifts have culminated in a much broader spectrum of commercial species, much closer utilization in trees of small diameters, and greater utilization with respect to mill residues.

In 1978, the more than 800 primary wood-using mills of various kinds operating in the Province gave direct employment to about 78,000 persons and paid out wages and salaries in the amount of \$1.2 billion. The Gross Provincial Product for Ontario was \$89.7 billion of which the value added by the forest industry was about \$2.1 billion, or 2.3 per cent of the total of all economic activity in the Province. This was a relative decrease from 2.6 per cent in 1973.

Northern Ontario is the dominant area in terms of wood harvested and the manufacture of primary forest commodities. The south is dominant in the production of consumer goods, and as a source region of most supplies and services. The importance of the forest industry to the north is strongly emphasized by the fact that 77 and 20 per cent of the total employment in manufacturing in the northwestern and north-eastern regions, respectively, is forest-oriented. In the more highly industrialized southern region, the forest industry provides only 6 per cent of the total employment in manufacturing.

The forest industry is highly cyclical in nature, subject to the influences of housing and business cycles as well as to labour/management disputes and structural changes such as integration, greenfield development, and large production capacity increments. Forest industries in Ontario are more profitable than in Canada as a whole, although in comparison to other Canadian industries, the Canadian forest industries are comparable or lower in profitability. Physical productivity has risen dramatically in the last two decades, and this has been matched by an equally significant rise in the industries' real wages.

In the national setting, Ontario accounted for 18 per cent of Canada's timber harvest, 8 per cent of lumber output, 20 per cent of wood pulp production and 24 per cent of the paper and paperboard products produced in Canada. Perhaps one of the most important measures to be considered is the degree of manufacture of wood that takes place within provincial boundaries. In this respect, Ontario has reached a level of economic maturity that is unequalled in Canada. The value added by logging and manufacturing of a cunit (100 cubic feet) of roundwood is \$292 in Ontario, \$218 in Quebec and \$142 in British Columbia. However, in regard to labour productivity as measured by value added per man-year, Ontario stands behind both Quebec and British Columbia.

For Canada as a whole, the value of all exports was \$51.7 billion, Ontario accounting for \$22.8 billion, or about 44 per cent. Exports of Ontario pulp and paper products, manufactured wood products and unmanufactured wood were 71, 28 and 1 per cent, respectively, of Canadian forest products exports. Ontario's major markets were the United States receiving an overwhelming 94 per cent and the United Kingdom and Europe, each with approximately 2 per cent of Ontario forest products exports.

The Ontario forest industry is an important net exporter. During 1978, foreign sales amounted to \$1.5 billion, comprising 6.5 per cent of total Ontario exports and almost 14 per cent of Canada's total exports of forest products. Foreign imports registered \$0.4 billion or 1.4 per cent of total Ontario imports and 57 per cent of Canada's total imports of forest products.

Associated with the 78,000 persons directly employed in the Ontario forest industry, there are another 78,000 persons indirectly employed in the provision of goods and services to the industry. The total direct and indirect employment was 156,000 persons. In addition, the Ministry of Natural Resources provided about 1,165 man-years of employment on a permanent basis and the equivalent of 1,745 man-years of employment on a temporary basis in forest management and forest protection activities carried out primarily in support of the forest industry.

Essentially, the sawmill establishments are usually owned by individuals or families, while the larger pulp and paper firms are generally Canadian public companies or are subsidiaries of foreign firms. The forest industries account for 6.5 per cent of sales of Ontario manufacturing industries. In comparison, Transportation, Food and Beverage, Primary Metal and Petroleum and Coal Products industries accounted for 22.4, 13.1, 9.1 and 5.2 per cent, respectively.

During 1978, operating expenditures of the forest industry amounted to \$4.7 billion, of which 32 per cent was spent on the acquisition, harvest and transport of wood, 23 per cent on wages and salaries, 22 per cent on miscellaneous items, 6 per cent on purchased fuel and electricity and the balance on the purchase of various materials and supplies. Capital and repair expenditures claimed an additional \$487 million.

Transportation facilities are vital to the forest industry. In 1978, 35.5 million tons of freight were hauled to and from the mills, of which 80 per cent consisted of wood, other raw materials and process equipment inbound to the mills. The remaining 20 per cent were primary products outbound from the mills. This is a weight-loss ratio of 4 to 1, indicating why much of the industry is located near its raw materials, rather than being market-oriented. Rail, truck and water carriers are all transfer agents, respectively sharing 28, 71 and 1 per cent of the tonnage of this enormous transport activity. The forest industry is estimated to have spent in excess of \$351 million on freight in 1978, of which 77, 21 and 2 per cent went to rail, truck and water carriers respectively.

The forest industries consume almost 17 per cent of the energy used by the Ontario manufacturing industries. The pulp and paper industry is the largest single energy consumer, using about 14 per cent of energy consumed by Ontario manufacturing industries. The pulp and paper industry is also the most energy-intensive forest industry and in 1977 ranked as the fifth most energy-intensive manufacturing industry in the Province with an energy expenditure of \$266 per every thousand dollars of value added. In the logging industry, fuel oil and gasoline account for 95 per cent of the energy input. Electricity accounts for 40 per cent of wood industries' energy input. In the paper and allied industries, 80 per cent of energy consumption is equally divided between electricity and natural gas.

In 1978, the Ontario forest industry paid \$37.2 million in stumpage charges for wood harvested, and almost \$2 million in fixed charges, to the provincial government. Corporation income taxes amounted to approximately \$84 million, while employees of the industry are estimated to have paid in excess of \$142 million in personal income taxes. Taxes and fees of all kinds, both direct and indirect, levied on the forest industry and its employees, are estimated to have been \$472 million.

In the 1978-79 fiscal year, the Ontario Ministry of Natural Resources had a total budget of \$237 million. Out of this amount, approximately \$63 million was spent on forest management and forest protection activities; that is, directly on activities to replace or improve the timber resource in support of the forest industry.

Private forest lands in Ontario are either in large tracts devoted to forest production or smaller holdings usually operated as part of a farm enterprise. Even though it is only 9 per cent of Ontario's forest land, private forest land produced 28 per cent of the unmanufactured wood in 1978. Farm woodlots still supply a considerable amount of wood, but accurate figures are not available.

Forest access roads built by the forest industries totalled over 12 thousand miles. These resource access roads, along with those built and maintained by the Ontario Ministry of Natural Resources, open vast areas to hunters, fishermen and other recreationists. It is difficult, however, to accurately relate recreational spending patterns to the existence of resource access roads.

INTRODUCTION

In 1969 a consultant study was undertaken at the request of the then Department of Lands and Forests, and resulted in a report entitled "The Ontario Forest Industry: Its Direct and Indirect Contribution to the Economy."¹ The data for that analysis was available to 1966. In early 1977, an update of the 1969 report was published², and was based on data available to 1973. The present report is the second, revised edition of the 1969 report; data available to 1978 is used.

A number of refinements and clarifications in both methodology and concepts had been incorporated into the 1977 report, and certain sections are expanded and added in this edition. The basic methodology remains the same as in the previous studies so that important changes may be detected. It is anticipated that much useful information is presented in readily usable form in this report and that it will reveal to the reader the role of the forest industry in the provincial and regional economies.

The objective of this study is to present measurements of normally-employed economic criteria, in both physical and financial terms. These include value added by manufacture, employment and transportation volumes that are attributable to the Ontario forest industry. Wherever possible, measurements have been direct. In other cases, the measurements have been approximated indirectly.

A chapter has been included on the revenues and expenditures of the forest-related activities of the Ministry of Natural Resources. The reason for this may be found within the Canadian constitution, which gives to the various provinces the control of natural resources within respective provincial boundaries. Ontario has retained ownership of 91 per cent of its forest lands in the Crown, only granting by means of timber licences or Forest Management Agreement the right to harvest specified species and amounts of timber on designated lands. The licensee pays for timber harvested at contracted rates. The Ministry, as owner of the resource, is ultimately responsible for its administration and management, and exercises an influence on the forest industry both through legislation and regulation and through pricing and expenditures.

¹Hereinafter to be referred to as "the 1969 study" or "the 1969 report."

²Hereinafter to be referred to as "the 1977 report."

CHAPTER I

DEFINITION OF THE FOREST INDUSTRY

1.1 Standard Industrial Classification

For the purpose of this study, the term "forest industry" is understood to include Logging, the Wood Industries, and the Paper and Allied Industries groups, as defined in the Standard Industrial Classification (S.I.C., 1970) of Statistics Canada. The main sectors of the forest industry are listed below:

THE FOREST INDUSTRY (1,282)¹

<u>S.I.C. No.</u>	<u>Industrial Sector</u>
-------------------	--------------------------

LOGGING (255)

031 Logging (255)

0311 Pulpwood logging

0319 Logging, n.e.s.²

WOOD INDUSTRIES (708)

251 Sawmills, planing mills and shingle mills (225)

2511 Shingle mills (0)

2513 Sawmills and planing mills (225)

252 Veneer and plywood mills (22)

254 Sash, door and other millwork plants (303)

2541 Sash, door and other millwork plants, n.e.s.)
) (167)

2542 Hardwood flooring plants)

2543 Manufacturers of pre-fabricated
buildings (woodframe construction) (21)

2544 Manufacturers of wooden kitchen cabinets (115)

¹ Numbers in parentheses denote the number of establishments in Ontario during 1978 in the sector.

² n.e.s. means "not elsewhere specified."

- 256 Wooden box factories (77)
- 258 Coffin and casket industries (7)
- 259 Miscellaneous wood industries (74)
 - 2591 Wood preservation industry (7)
 - 2592 Wood handles and turning industry (9)
 - 2593 Manufacturers of particleboard (9)
 - 2599 Miscellaneous wood industries, n.e.s. (49)

PAPER AND ALLIED INDUSTRIES (319)

- 271 Pulp and paper mills (37)
- 272 Asphalt roofing manufacturers (5)
- 273 Paper box and bag manufacturers (153)
 - 2731 Folding carton and set-up box manufacturers (60)
 - 2732 Corrugated box manufacturers (55)
 - 2733 Paper and plastic bag manufacturers (38)
- 274 Miscellaneous paper converters (124)

An industry is defined in the Standard Industrial Classification as a group of operating units, in other words, companies or individuals, engaged in the same or similar kind of economic activity, such as logging camps, pulp and paper mills, and sawmills. The S.I.C. system itself is subject to revision. For example, the Printing Trades group was included in the Paper and Allied Industries group until 1948 and the Furniture and Fixtures Industries group was part of the Wood Industries group until 1960.

For this impact evaluation study, the Furniture and Fixtures Industries group is not considered to be part of the forest industry because the cost of wood materials is less than half of the total cost of all raw materials and this ratio has been decreasing with time. Notwithstanding the omission, in 1978 the Furniture and Fixtures Industries consumed about \$18 million worth of hardwood lumber, \$9 million worth of softwood lumber and gave employment to 22,400 workers. They are therefore of considerable economic significance. Other changes to the S.I.C. within the pertinent time period have been incorporated into the data base of this study.

1.2 Standard Commodity Classification

Ontario's forest industry products are extremely diverse and include the following commodities as specified by the Standard Commodity Classification (S.C.C., 1972) of Statistics Canada:

<u>FOREST INDUSTRY PRODUCTS</u>	
<u>S.C.C.</u>	<u>Commodity Group</u>
<u>No.</u>	

CRUDE WOOD MATERIALS

231	Logs and bolts (by species)
236	Pulpwood (roundwood by species)
237	Other roundwood, untreated (piling, poles, etc.)
238	Pulpwood chips (by softwood and hardwood)
239	Other crude wood materials (Christmas trees, fuelwood, etc.)

WOOD FABRICATED MATERIALS

331	Lumber and sawn timber (by species)
332	Shingles and shakes (by species)
333	Railway ties, untreated, and other sawmill products (by species and uses)
336	Millwork (woodwork) and building components (by products)
337	Veneer (by species)
338	Plywood (by species)
339	Other wood fabricated materials (particleboard, tool handles, boxes, charcoal, etc.)

PULP

341	Woodpulp (by classes of dissolving, sulphate, sulphite, groundwood and semi-chemical)
-----	---

PAPER AND PAPERBOARD

- 351 Paper for printing (by classes such as newsprint, book paper and printing paper)
- 352 Fine and miscellaneous fine papers (by classes such as writing paper, blotting paper, etc.)
- 353 Tissue paper and sanitary paper stock (by use)
- 354 Wrapping, packaging and related paper (by use)
- 356 Paperboard (linerboard, corrugating board, etc.)
- 357 Building paper and board (asphalt paper, hardboard, etc.)
- 358 Wet machine board (by classes such as shoeboards, binder boards, etc.)
- 359 Converted paper (by classes such as wrapping paper, waxed paper, wallpaper, etc.)

CHAPTER II

PROFILE OF THE ONTARIO FOREST INDUSTRY

2.1 Historical Background¹

As early as 1683 all suitable timber in the forests of Upper Canada was reserved for the use of the French Navy and in 1827 the first stumpage fees were introduced in districts having timber not "fit and proper for His Majesty's Navy" but obviously fit for "lesser" uses.

Though trade in timber seems to have played a prominent role in the early commercial development of the Province, it is only since 1867, the year of Confederation, that a detailed record of timber harvest has been maintained.

Toward the close of the nineteenth century, Ontario experienced its greatest production of red and white pine lumber. The cut of pine from Crown lands during the period of 1890 and 1910 ranged in amount from a low of 508 million board feet (in 1891) to a high of 952 million board feet (in 1896). About the year 1907, when 790 million board feet of red and white pine were cut, the great pine era was in decline. Production of these species began to decrease and within three decades was below 150 million board feet.

Recognition of the importance of value added by manufacturing was seen as early as 1898 when the provincial government passed legislation requiring that all logs cut on Crown lands must be processed in Canada. Even in this early era, exports of forest industry products were of importance to Ontario, as seen by the fact that from 1869 and 1879 they totalled \$3 to \$9 million per year or 15 to 35 per cent of total provincial exports.

A process for making pulp and then paper from wood was first developed in 1859 and Ontario had its first soda pulp mill in 1864. The first sulphite mill was built in 1888, and the first sulphate process (kraft) mill was built in 1907. After the turn-of-century and the United States tariff allowances for duty-free newsprint importation from Canada, the newsprint industry developed rapidly in Ontario, further increasing the contribution of the forest industry to the provincial economy. It also resulted in the first industrial utilization of the Province's extensive boreal (coniferous) forest, the timber of which was largely unsurveyed at the time. The pulp and paper industry, in general, developed rapidly until the start of the Depression

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- ¹a) F.B. Hough, Report upon forestry; U.S. Government Printing Office, Washington, 1880.
- b) J.D.B. Harrison, Economic aspects of the forests and forest industries of Canada; King's Printer, Ottawa, 1938.
- c) Ontario Department of Lands and Forests, The history and status of forestry in Ontario; Toronto, 1943.
- d) Ontario Economic Council, A forest policy for Ontario; Queens Printer, Toronto, 1970.

in 1929. There was no significant development in the 1930's.

Also during the 1900's and 1910's the main concentration of sawmills in Ontario moved from the Ottawa Valley-Algonquin-Muskoka-Parry Sound areas to North Bay and farther north, eventually up as far as Chapleau. The 1930's, as with the pulp and paper sector, was a decade of stagnation and little change in the lumber industry.

During and immediately following World War II, there was a resurgence of industrial development in pulp and paper mills, sawmills, and veneer and plywood plants. This was due to both the post-war population expansion and the general post-war economic boom. The pulp and paper industry expanded along the north shore of Lake Superior and into northwestern Ontario. The sawmill industry moved farther into northeastern Ontario and concentrated around Hearst.

The late 1950's and the 1960's was a period of relative uneventfulness for the forest industry. The early 1970's however, witnessed a large growth in the independent sawmill industry because of new small-log sawing technology and the development of various chipper-canter type headrigs. There was a large mid-1970's expansion of kraft pulp mill capacity and a large integration of the pulp and paper industry into lumber (stud) production. This came about, in part, from provincial government advocacy of better and higher utilization by the pulp and paper industry of the larger, higher quality sawlog timber on their usually extensive timber licences by either building their own sawmills or by surrendering the harvesting rights to independent sawmills. During the late 1970's there was a large, rapid growth and development of the particleboard-waferboard industry that increased mill residue and poplar utilization levels. The 1980's began with a modernization and pollution abatement program in the pulp and paper industry which was initiated by the federal and provincial governments. This program will result in new capital investments of \$1.5 billion over the first half of the current decade.

The quantity of roundwood produced following the Second World War is shown in Figure 1 and summarized in Table 1. Generally, the output of private land timber has held constant in absolute production, but due to increased Crown land harvest, has slowly declined in proportion from 30 per cent of the provincial total, dipping to a low of 22 per cent in 1973 and currently (1978) standing at 28 per cent.

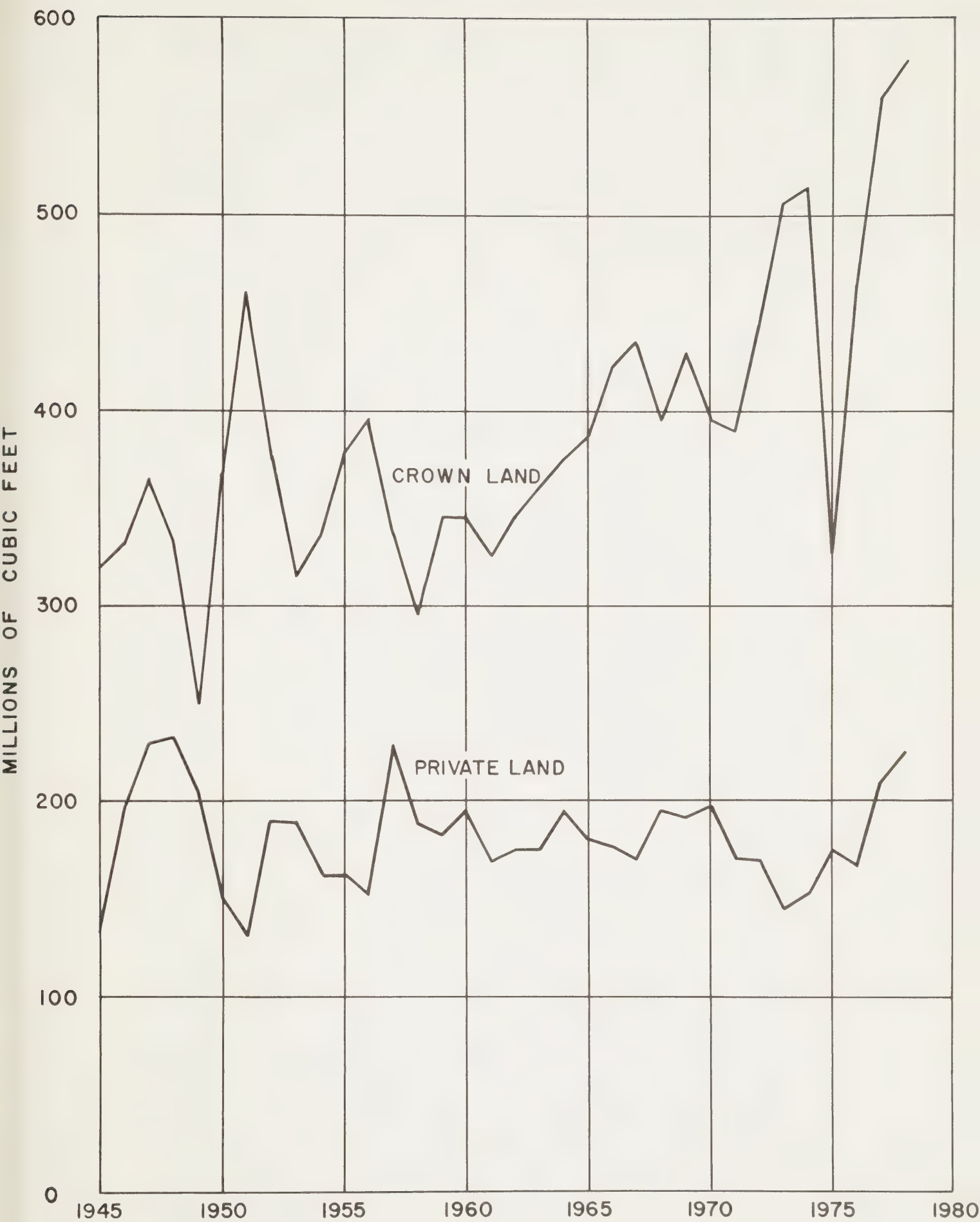


FIGURE 1. ROUNDWOOD PRODUCTION ON CROWN AND PRIVATE LANDS, ONTARIO.

TABLE 1

ONTARIO ROUNDWOOD SUPPLY
(Million cubic feet)

	1946	1956	1966	1973	1976	1978
Industrial Logs & Bolts Pulpwood	143 256	166 318	187 369	225 394	260 332	292 375
Other ¹	11	4	9	7	7	5
Sub-Total	410	488	565	626	599	672
Pulp Chips Roundwood Shipments out of Ontario	nil	nil	37	97	125	173
Roundwood Shipments into Ontario	n.a.	n.a.	n.a.	(38)	(29)	(34)
	n.a.	n.a.	n.a.	51	49	59
TOTAL	--	--	--	736	744	870

¹This item includes non-industrial products (poles and pilings, round mining timber, fence posts, rails and hewn ties, and miscellaneous roundwood), but does not include fuelwood and wood for charcoal.

2.2 Structure of the Industry

There are approximately 750 sawmills in Ontario. More than 600 of them individually produce less than one million board feet of lumber per year, and only 23 sawmills produce more than 25 million board feet annually. Pulp is produced in fourteen major mills (each having an output of more than 400 tons per day) and in ten smaller mills. Of the 24 veneer mills, about half are of a significant size, employing 100 or more individuals each, as are all nine particleboard mills. There are another 50 or so mills producing such miscellaneous products as doors, boxes and other millwork.

Ontario's Gross Provincial Product (the summation of all value added) in 1978 was \$89.736 billion. The value added by the forest industry in 1978 of about \$2.1 billion (\$1.4 billion in 1973 and \$0.7 billion in 1966) was 2.3 per cent of the total value added. Pulp and paper mills comprise the largest part of Ontario's forest industry although they accounted for only 35 per cent of the value added by the forest industry in 1978 as compared to 41 per cent in 1966. Sawmills, and veneer and plywood mills accounted for 9 per cent of the Ontario forest industry value added in 1966, increased to almost 12 per cent in 1973, fell off to 8 per cent in 1976 and returned to 12 per cent in 1978. Other paper and allied industries contributed 28 per cent of the forest industry value added in 1978, 29 per cent in 1973 and 27 per cent in 1966.

In 1978, the share of forest industry employment for pulp and paper mills was 29 per cent, that of other paper and allied industries was 39 per cent and sawmills and veneer and plywood mills was 12 per cent. The comparable figures for 1973 were 28, 32 and 12 per cent, respectively. The value added and total activity employment is shown in Table 2. The employment figures do not include working owners and partners or special adjustments which will be applied in Chapter 3.

In 1978, the quantity of lumber produced was 1,622 million board feet. Approximately 15 per cent of this was hardwood, as indicated in Figure 2.

Veneer and plywood production has grown substantially in the last four decades. The quantities produced are shown in Figure 3. The value of shipments for Plywood and Veneer Mills in 1966, 1973 and 1978 were \$39 million, \$56 million and \$89 million, respectively. Originally, only birch was used for veneer but the industry also utilizes several other hardwood species. The bulk of veneer exported to the United States, however, is still birch and more than half of the plywood produced now is from poplar. Ontario-produced softwood plywood only came on the market in the mid-1960's.

Wood-using industries, other than sawmills and planing mills or veneer and plywood mills, had selling values of

TABLE 2

VALUE ADDED AND EMPLOYMENT IN THE ONTARIO FOREST INDUSTRY ¹

1973 and 1978

SECTOR	VALUE ADDED			EMPLOYMENT			
	1973		1978	1973		1978	
	Millions \$	Per Cent	Millions \$	Number	Per Cent	Number	Per Cent
Logging	146	11.4	254	8,983	12.2	9,569	12.5
Sawmilling and Planing Mills	118	9.3	198	6,620	9.5	6,888	9.0
Veneer and Plywood Mills	32	2.5	47	2,434	2.2	2,317	3.0
Other Wood Industries	160	12.5	271	11,608	13.0	12,737	16.6
Wood Industries	310	24.3	515	20,662	24.7	21,946	28.6
Pulp and Paper Mills	452	35.4	745	21,271	35.7	22,177	28.9
Other Paper and Allied Industries	370	28.9	573	24,120	27.4	23,032	30.0
Paper and Allied Industries	822	64.3	1,318	45,391	63.0	45,209	58.9
TOTAL	1,278	100.0	2,087	75,036	100.0	76,724	100.0

¹ Total activity basis, not including adjustments or working owners and partners.

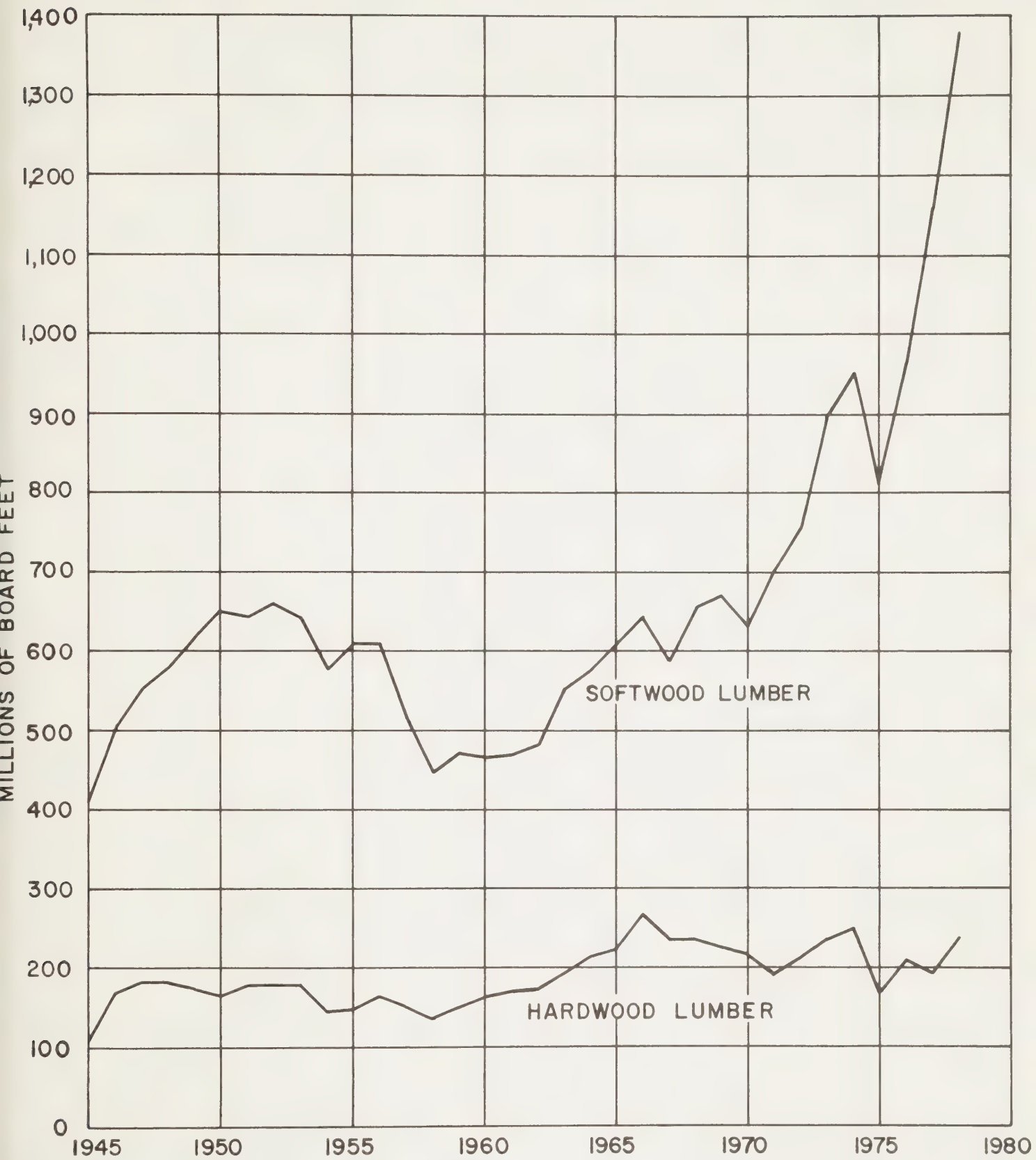


FIGURE 2. SOFTWOOD AND HARDWOOD LUMBER PRODUCTION, ONTARIO.

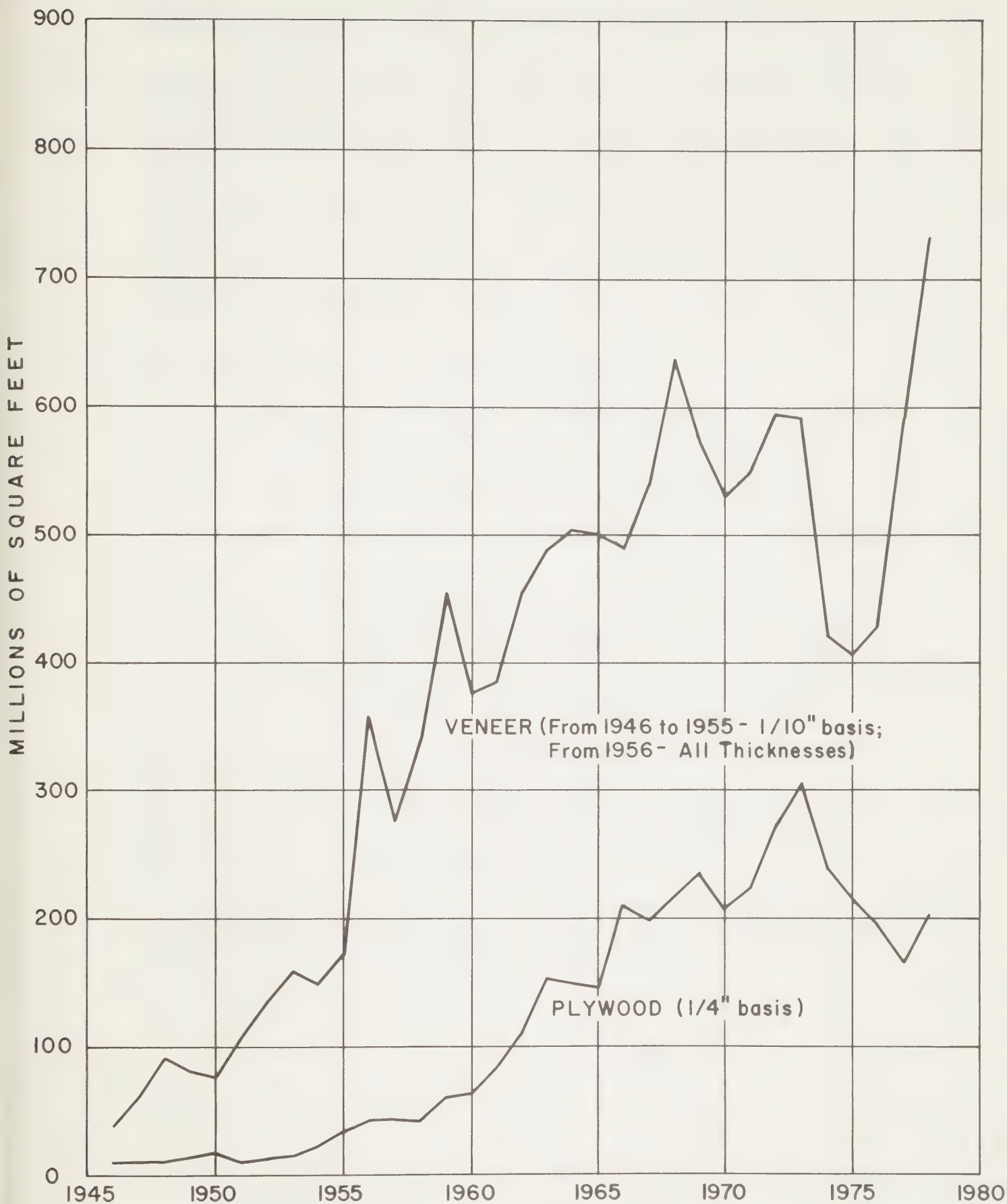


FIGURE 3. HARDWOOD PLYWOOD AND VENEER PRODUCTION, ONTARIO

shipments of approximately \$590 million in 1978 and \$328 million in 1973.

Pulp mills in Ontario have more than doubled their output since 1946, largely through the expansion and conversion of existing facilities. In 1978, sulphate (or kraft) pulp, which has been the product of greatest growth, accounted for 49 per cent of total pulp production.

Pulp production figures are shown in Figure 4 and Table 3. Additional data in regard to the major grades of paper and paperboard shipped by mills is given in Table 4. Other paper and allied industries, including paper and paperboard converters, had product sales of \$1,365 million in 1978 and \$816 million in 1973.

2.3 Regional Distribution and Importance

Figure 5 shows the three major economic regions of Ontario. The Northwestern and Northeastern Regions are the same as used by the Economic Development Branch of the Ontario Ministry of Treasury and Economics, while the Southern Region shown combines three of that Ministry's planning regions. These regions do not coincide with the administrative districts or regions of the Ministry of Natural Resources.

Characteristics of the regional distribution of the forest industry are summarized in Table 5. This table illustrates that the forest industry relies heavily upon the natural resources of the two northern regions. However, employment is greatest in the south, where the secondary converting plants are concentrated. This pattern has developed naturally in accord with economic influences governing optimum mill location. In addition to acquisition of wood, the forest industry purchases large amounts of supplies, equipment, and services. Some 46 per cent of such goods and services were purchased from southern Ontario, only 2 per cent from northern Ontario¹ and the majority (52 per cent) derived from outside of the Province.

The forest, mining and tourist industries are currently the three mainstays of the economy in the north, providing the majority of employment opportunities.

¹ The two northern economic regions.

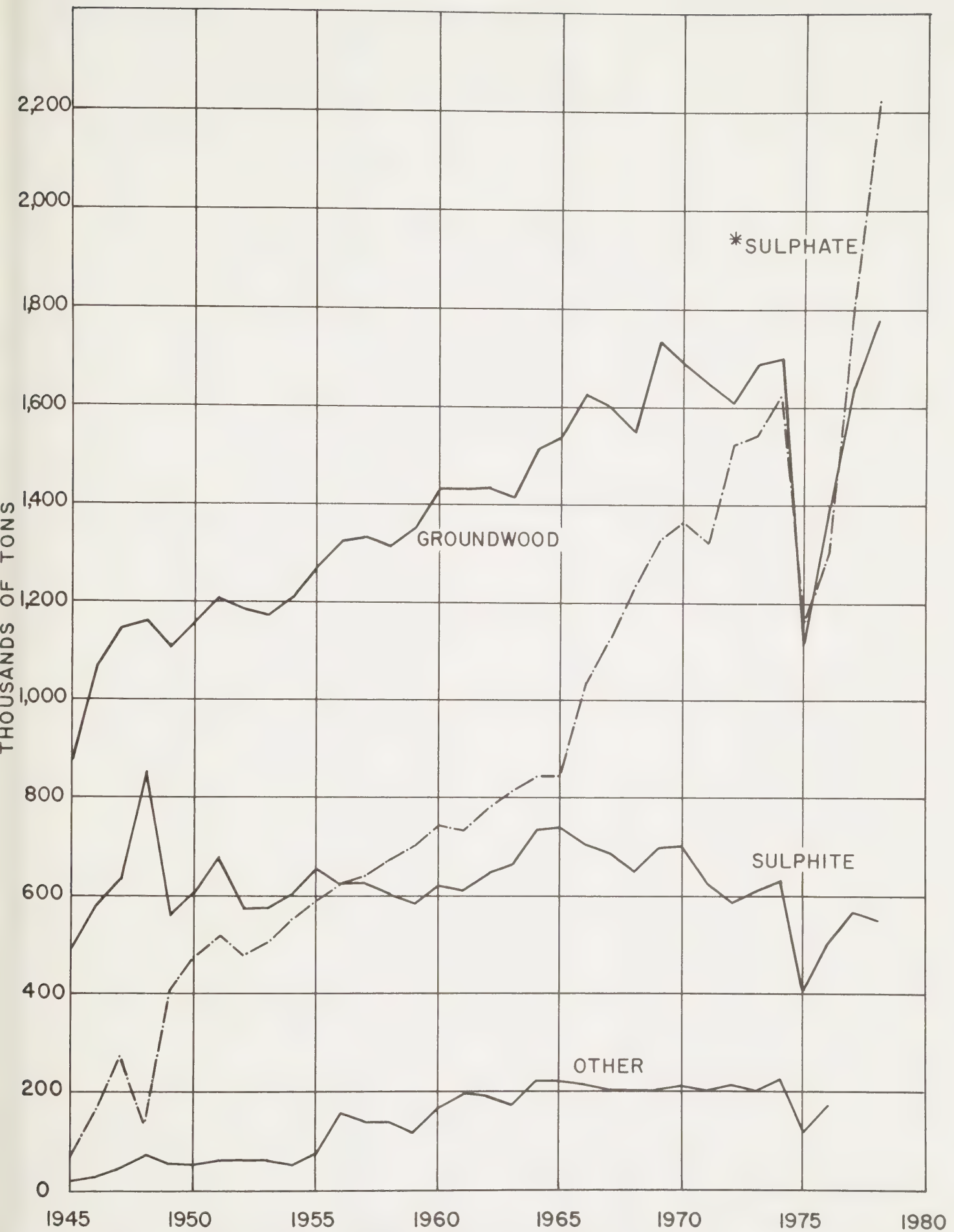


FIGURE 4. WOOD PULP PRODUCTION BY TYPE, ONTARIO.

* includes Other after 1976.

TABLE 3

ONTARIO PULP PRODUCTION BY TYPE

1946, 1966, 1973 and 1978

TYPES	1946		1966		1973		1978	
	'000 tons	per cent	'000 tons	per cent	'000 tons	per cent	'000 tons	per cent
Groundwood	1,069	58.1	1,625	45.3	1,586	41.7	1,773	39.0
Sulphite	581	31.6	707	19.7	613	15.2	554	12.2
Sulphate	157	8.6	1,038	28.9	1,541	38.1	2,222	48.8
Other	31	1.7	217	6.1	204	5.0	(a)	(a)
TOTAL	1,838	100.0	3,587	100.0	4,044	100.0	4,549	100.0

(a) included with "sulphate"

TABLE 4

ONTARIO MILL SHIPMENTS OF BASIC PAPER AND PAPERBOARD

1973 and 1978

PAPER GRADE	1973				1978			
	Quantity 000 Tons	Per Cent of Total Quantity	Value Million \$	Per Cent of Total Value	Quantity 000 Tons	Per Cent of Total Quantity	Value Million \$	Per Cent of Total Value
Newsprint	1,959	57.1	294	44.2	1,836	51.7	555	44.5
Printing & Writing	564	16.4	189	28.4	796	22.4	405	32.5
Wrapping	95	2.8	35	5.3	85	2.4	56	4.5
Paperboards	719	20.9	123	18.5	751	21.2	191	15.3
Other Paper	96	2.8	24	3.6	84	2.3	40	3.2
TOTAL	3,433	100.0	665	100.0	3,552	100.0	1,247	100.0

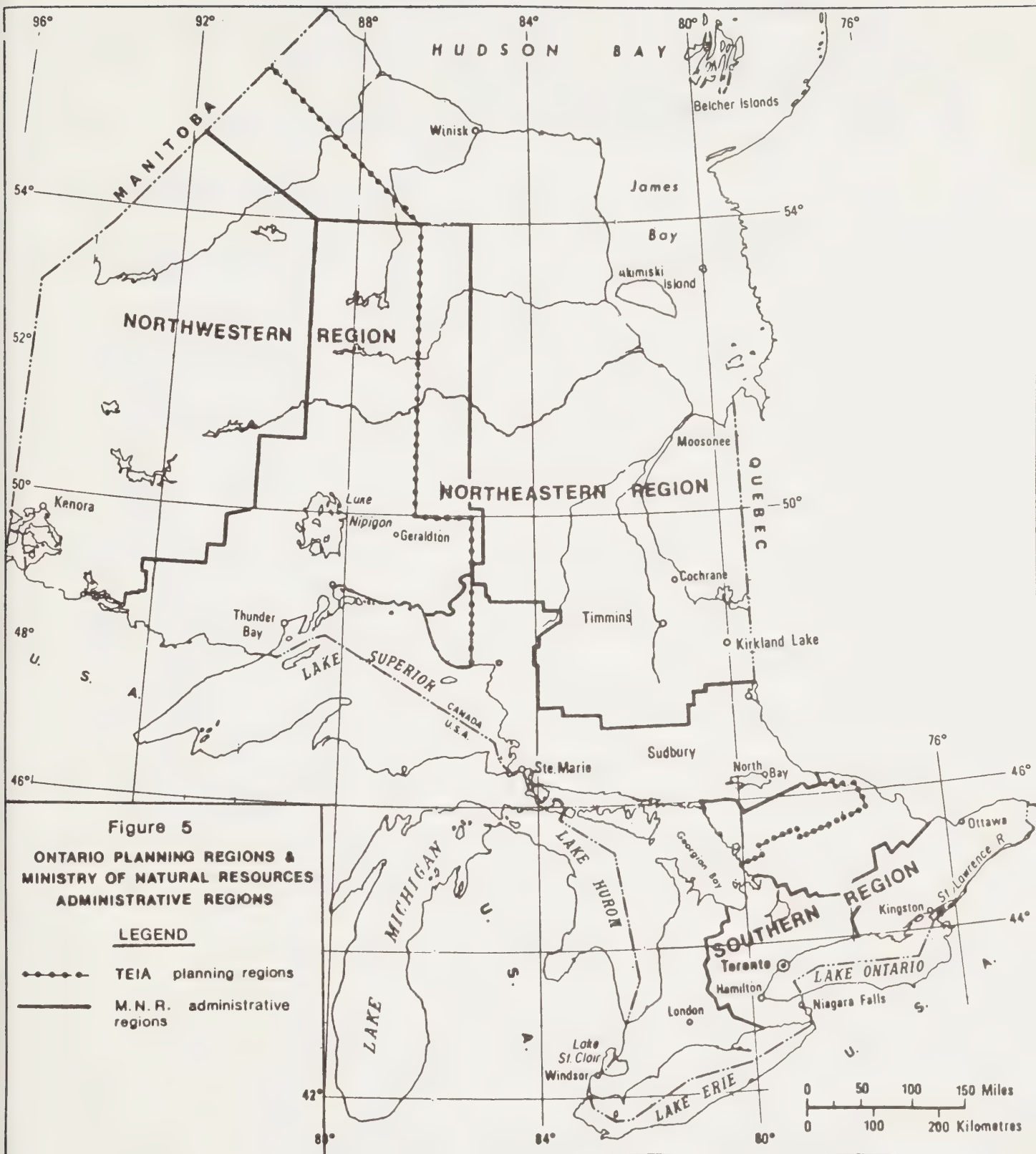


TABLE 5

REGIONAL DISTRIBUTION OF THE ONTARIO FOREST INDUSTRY, 1976 ¹

	North- western	North- eastern	Southern	Total
Total Area (1963)	60	28	12	100
Productive Forest Land (1963)	46	45	9	100
Merchantable Timber Volume (1963)	40	50	10	100
Roundwood Production	52	33	15	100
Value of Production - Logging	38	59	3	100
Value of Production - Wood Industries	23	12	65	100
Value of Production - Paper & Allied Industries	13	23	64	100
TOTAL Value of Production - Forest Industry	17	24	59	100
Employment - Logging	44	54	1	100
Employment - Wood Industries	24	10	66	100
Employment - Paper and Allied Industries	12	20	68	100
TOTAL Employment - Forest Industry	21	20	59	100

¹
unless otherwise stated

While Table 5 illustrates how total employment within the forest industry was distributed between the regions, another important statistic is the share of total manufacturing employment within the regions that was attributable to the forest industry. That relationship is illustrated by the following figures:

	<u>1966</u>	<u>1972</u>	<u>1976</u>
Northwestern Region	69%	76%	77%
Northeastern Region	31%	32%	29%
Southern Region	6%	6%	6%
Ontario	8%	10%	8%

2.4 Cyclicalilty, Profitability and Productivity

Cyclicalilty

The forest industry is fundamentally cyclical in nature, with the annual production of primary forest products responding to fluctuations in the general economic climate, particularly those brought on by depressions, recessions and wars. Yet, over the past eight decades, the trend line of average annual production has remained fairly constant. The composition of the harvest has, however, changed substantially. There have been strong shifts toward the use of a greater number of species and of smaller diameter classes of trees. There has also been much closer utilization, especially of mill residues. These changes were made possible largely by the expansion in reconstituted wood products (typically pulp-based goods and particleboard) and by the introduction of small log diameter sawmill technology.

In this assessment of the forest industry, it is necessary to consider the fibre industry (ostensibly pulp and paper) separately from the solid product industry (primarily lumber and plywood). In the pulp and paper sector, the cyclicalilty is a function of the general business cycle; in other words a function of the cycle of general economic activity and demand for pulp and paper products. There also seems to be strong "expansion" cycles within this sector, mainly a result of large capacity changes due to the large scale nature of the facilities and investments required. The key characteristic of this sector, similar to that in other mature, capital-intensive industries in which corporate concentration and labour organization is high, is that the cycle is more one of profit variation than of employment and commodity production.

In the Canadian lumber sector, cyclicalilty is largely a function of the U.S. housing cycle within the general business cycle. In contrast to the nature of the pulp and paper sector, which exhibits certain oligopolistic traits, the sawmill industry is not capital intensive, is only partially unionized and it's degree of concentration is low, i.e. it

approaches being a perfectly competitive industry. In addition, a substantial number of the firms experience cash flow problems which result in cycle reenforcing actions. The exponential growth in sawmill woodchip production has added a major new dimension that makes the sawmills dependent on the pulp and paper sector and vice versa to a lesser degree. The result is a sawmill industry characterized by "boom-and-bust" cyclicalities in all aspects of its operations -- profit, production and employment.

The 1970's was a decade of continuous volatility in forest products markets. In addition to the general cyclic influence of the business and building (housing) cycles, there were a number of specific developments and disruptions of significance in northern Ontario. These included major expansions of independent sawmilling capacity, pulp and paper industry integration into sawmilling by both acquisition and new mill construction, continued labour-management disputes in the pulp and paper sector, and mammoth capital commitments by the pulp and paper mills to effect both cost control (modernization) and pollution control in the 1980's. Similar influences can be expected to occur in the future.

Cyclicalities may well be dampened in the future by reduced greenfield development in the industry because of a lack of unallocated fibre, and the increasing desirability of community stability as a socio-economic objective. In the future, federal and provincial fiscal policy will probably be directed towards the dampening of cyclical influences.

Profitability

Estimates of the profitability of Ontario sawmills and pulp and paper mills appear in Table 6, using three ratios commonly used as indices of profitability. These ratios are derived from corporation income tax forms filed for Ontario.

Even for this short series, Table 6 illustrates the cyclical nature of the forest industry in general and the sawmill sector in particular, which had income as a percentage of sales varying from 11.2 to -2.0 over four years (1973-1976).

More data is available for the Canadian industry as a whole, enabling an inter-industry comparison. Table 7 provides the information for selected industries. It clearly illustrates the large fluctuations in profitability in both the wood and the paper and allied industries.

For this seven year period, net income as a percentage of sales indicates that the forest industries are similar in profitability to all manufacturing and all industries. Net income as a percentage of shareholders' equity shows a higher profitability for wood and furniture than for all manufacturing and total industries, while paper and allied

TABLE 6

PROFITABILITY OF THE FOREST INDUSTRY IN ONTARIO, 1970-1977

Sector	1970	1971	1972	1973	1974	1975	1976	1977	8-year Average
	Net Income/Sales (per cent)								
Sawmills	-1.8	0.8	4.7	11.2	10.7	2.6	-2.0	5.8	4.5
Pulp & Paper Mills	3.2	2.6	1.8	5.5	20.7	11.1	4.3	4.7	6.7
Net Income/Shareholder's Equity (per cent)									
Sawmills	-5.3	3.3	21.8	43.6	25.8	8.0	-5.8	17.6	15.1
Pulp & Paper Mills	4.2	2.6	1.9	6.9	35.0	13.7	5.6	7.6	9.7
Net Income/Total Assets (per cent)									
Sawmills	-1.8	0.9	5.7	12.5	12.0	2.4	-1.7	6.7	5.0
Pulp & Paper Mills	2.8	1.7	1.3	4.4	19.0	7.3	2.7	3.6	5.4

NOTE: No inflation adjustments applied. Ratios are for comparison purposes only.

TABLE 7

Profitability of Selected Industry Groups,
Canada, 1972-1978

Sector	1972	1973	1974	1975	1976	1977	1978	7-Year Average
	Net Income/Sales (per cent)							
Wood & Furniture	3.4	6.6	4.0	1.3	3.0	3.7	6.0	4.0
Paper & Allied, & Forestry (logging)	1.8	5.3	8.6	5.5	3.7	3.3	5.9	4.9
Primary Metals	8.1	12.1	12.2	5.7	3.9	5.9	7.9	5.9 ^a
Total Manufacturing	4.2	5.0	5.3	4.2	3.7	3.8	4.3	4.4
Total Industries	4.3	5.0	5.0	3.9	3.6	3.6	4.1	4.2
Sector	Net Income/Shareholders' Equity (per cent)							
Wood & Furniture	11.1	23.0	12.6	4.6	11.5	12.7	21.8	13.9
Paper & Allied, & Forestry (logging)	3.1	10.5	19.3	10.4	7.8	7.8	15.2	10.6
Primary Metals	8.1	15.1	17.2	10.5	7.3	10.7	14.9	10.9 ^a
Total Manufacturing	11.0	14.1	16.0	12.5	11.5	11.8	13.6	12.9
Total Industries	10.5	13.4	14.7	12.8	12.1	11.9	13.8	12.7
Sector	Net Income/Total Assets (per cent)							
Wood & Furniture	4.3	9.3	5.0	1.6	4.2	5.0	8.6	5.4
Paper & Allied, & Forestry (logging)	1.4	4.8	8.7	4.7	3.5	3.3	6.4	4.7
Primary Metals	4.2	7.6	8.4	4.9	3.4	5.3	7.6	5.3 ^a
Total Manufacturing	5.6	7.2	7.8	5.6	5.2	5.4	6.3	6.2
Total Industries	5.1	6.4	6.7	5.3	5.1	5.0	5.7	5.6

Note: No inflation adjustments have been applied. Ratios are for comparison purposes only.

a) Average calculated on basis of 1975-1978 since a composite index was used pre-1975.

and forestry (logging) has lower profitability. Net income as a percentage of total assets reveals a lower profitability for forest industries than for other industries.

A comparison of the profitability of Ontario forest industries with Canada shows that forest industries are more profitable in Ontario than in Canada as a whole. In a Price Waterhouse study of the pulp and paper industry, a regional analysis showed that Ontario firms (companies with head offices in Ontario) were significantly more profitable than those in other jurisdictions for the period 1967-1971.¹

The profitability of the Ontario forest industry in the future is very difficult to predict because of a number of factors. Forest products firms in Canada enter the 1980's with 40-45 per cent of their total earnings deriving from foreign exchange, a very lucrative situation, but one clearly susceptible to sudden and dramatic change. Second, the uncertainty surrounding real energy prices is a significant factor in the performance of the pulp and paper industry, one of Canada's most energy-intensive manufacturing industries. Finally, the cost of money (general interest rates) is very uncertain. The 1980's began with record high levels of interest rates which have since declined but have not stabilized. The response of the Ontario forest industry to these and other factors remains very uncertain.

Productivity

Table 8 presents indices of productivity compared to wage rates for three sectors of the forest industry. Gains in wages are expressed in real (deflated) terms. The trend towards larger, mechanized logging operations is reflected in the increased labour productivity of woods operations in Ontario. Cunits cut per man-hour increased some 3 per cent annually from 1973 to 1978. This increase in productivity per man-hour was matched by an annual increase in real wages per man-hour of 5 per cent for the period 1973 to 1978. Logging wages per unit volume of wood cut decreased about 9 per cent annually over the five-year period in real dollar terms.

The movement of pulp and paper mills into sawmilling and the increased proportion of production accounted for by larger sawmills is reflected by an increase in physical productivity per man-hour of 17 per cent annually over the period 1973 to 1978. Real hourly wages increased approximately 15 per cent annually but real wages per unit volume of production remained unchanged.

¹Source: A Study of Taxation Practices Related to the Pulp and Paper Industry, Price Waterhouse & Co.; (1973).

TABLE 8

ONTARIO FOREST INDUSTRY PRODUCTIVITY INDICES, 1973-1978

Year	Logging			Sawmills & Planing Mills			Pulp & Paper Mills		
	Wages/ Man-Hour	Wages/ Unit Volume	Volume/ Man-Hour	Wages/ Man-Hour	Wages/ Unit Volume	Volume/ Man-Hour	Wages/ Man-Hour	Wages/ Unit Volume	Volume/ Man-Hour
1973	100	100	100	100	100	100	100	100	100
1974	99	105	95	103	93	110	100	107	100
1975	98	113	89	105	115	95	75	86	90
1976	126	81	129	112	109	105	92	123	81
1977	132	78	142	117	97	114	122	122	100
1978	127	54	113	175	102	186	123	115	105
Six- Year Average Change (%)	+5	-9	+3	+15	--	+17	+5	+3	+1

Productivity in pulp and paper mills increased approximately one per cent annually over 1973 to 1978. This was associated with annual real hourly wage increases of 5 per cent and a wage per unit volume increase of 3 per cent annually over 1973 to 1978.

2.5 The National Setting

In terms of the development of secondary and tertiary industries, the forest economy of Ontario has reached a degree of maturity that exceeds other provinces by a considerable margin. In 1978, Ontario accounted for only 13 per cent of the nation's roundwood production but produced 22 per cent of the value added by logging and further manufacturing. Even after several years of rapid growth in other provinces, Ontario maintains a very considerable lead as indicated in Table 9.

Labour intensity of three main forest industry sectors measured as value added per man-year is presented in Table 10. In logging and sawmilling, Ontario is as labour intensive as Quebec but much more so than British Columbia. This is due largely to the economy-of-scale advantage that British Columbia has over eastern Canada because of their generally larger timber. Ontario's pulp and paper industry is more labour intensive than both British Columbia and Quebec. British Columbia mills are on average much newer and more capital intensive than Ontario's mills, and the difference between Ontario and Quebec can be attributed to the different composition of the pulp and paper industry in these two provinces. It will be interesting to see how these indices will change as a result of the pulp and paper industry modernization programs initiated by the federal and provincial governments.

In 1978, Ontario had 18 per cent of the area of Canada's forests suitable for regular harvesting and 20 per cent of the volume of merchantable timber. It accounted for 13 per cent of total Canadian roundwood harvested, some 8 per cent of lumber output, 20 per cent of wood pulp, and 24 per cent of the paper and board products. Finally Ontario employed about 78,000 employees in its forest industry which was equivalent to about 26 per cent of the total for the forest industry in all Canada.

2.6 Exports of Ontario Forest Industry

For Canada as a whole, the value of exports amounted to \$51.7 billion or 2.3 per cent of the Gross National Product in 1978. Ontario accounted for \$22.8 billion in exports, or 44 per cent of the Canadian total.

The value for forest-based products by kind, exported by Ontario and Canada is given in Table 11, which also shows the Province's share of total Canadian exports of forest products.

Table 12 clearly reveals that exports of pulp and paper products accounted for about 71 per cent of Ontario's forest products exports, manufactured wood products accounted for 28 per cent, and unmanufactured wood exports accounted for the remaining 1 per cent.

TABLE 9

VALUE ADDED PER CUNIT OF ROUNDWOOD

LOGGING AND MANUFACTURING IN THREE PROVINCES, 1973-1978

(\$ per cunit)

Year	Ontario			Quebec			British Columbia		
	Forestry	Manu- facturing	Total	Forestry	Manu- facturing	Total	Forestry	Manu- facturing	Total
1973	22	170	192	20	105	125	24	64	88
1974	28	229	257	23	132	155	28	78	106
1975	35	251	286	30	141	171	25	88	113
1976	31	221	252	27	155	182	28	88	116
1977	30	207	237	26	165	191	29	97	126
1978	35	257	292	26	195	221	32	111	143

TABLE 10

VALUE ADDED PER MAN-YEAR, IN LOGGING, SAWMILLS AND PLANING
MILLS, AND PULP AND PAPER MILLS, THREE PROVINCES, 1973-1978

(\$000 per man-year)

Year	Ontario			Quebec			British Columbia		
	Logging	Sawmills & Planing Mills	Pulp & Paper Mills	Logging	Sawmills & Planing Mills	Pulp & Paper Mills	Logging	Sawmills & Planing Mills	Pulp & Paper Mills
1973	19	22	26	16	19	26	30	27	38
1974	23	22	44	19	18	45	32	21	60
1975	26	19	32	20	20	41	31	23	57
1976	31	21	31	25	21	35	39	30	72
1977	33	26	39	29	26	42	40	39	64
1978	31	34	42	32	31	52	42	47	70

TABLE 11

EXPORTS OF ONTARIO FOREST INDUSTRY PRODUCTS, 1966, 1973 & 1978

(Million \$)

Commodity	1966	1973	1978		1978 Ontario as a % of Canada
	Ontario	Ontario	Ontario	Canada	
Logs, bolts and round timber	1.7	1.3	2.6	11.4	22.9
Pulpwood	7.9	2.9	1.7	8.6	19.8
Pulpwood chips	-	1.6	4.7	49.5	9.5
Other crude, and waste and scrap materials	6.1	2.7	0.4	6.7	6.0
Lumber & other sawmill products	31.0	104.7	322.4	3,013.1	10.7
Millwork	0.2	5.7	10.9	68.1	16.0
Veneer, plywood and other fabricated materials	15.9	24.8	96.2	199.6	48.2
Wood pulp	102.4	157.2	308.3	2,171.1	14.2
Paper for printing	237.0	300.8	668.9	3,111.2	21.5
Fine paper	5.5	21.1	12.1	13.5	89.7
Tissue and sanitary paper	1.3	0.5	15.7	23.3	67.3
Wrapping paper	3.8	9.0	22.6	104.1	21.7
Paper board	3.4	4.1	11.9	103.5	11.5
Building paper, building board and wet machine board	0.8	2.6	12.6	49.2	25.6
Converted paper products	3.8	11.6	31.4	43.0	73.0
TOTAL	420.8	650.6	1,522.4	8,975.9	17.0

A summary of Ontario forest products exports by destination is shown in Table 12.

Ontario's major markets are the United States, United Kingdom and the rest of Europe, comprising 94, 2 and 2 per cent, respectively. It is, therefore, evident that the Ontario forest industry is highly susceptible to market conditions and cost competition in the United States.

TABLE 12

VALUE OF ONTARIO FOREST INDUSTRY
EXPORTS, BY DESTINATION, 1978

(Million \$)

Commodities	Destinations					
	United States	United Kingdom	Rest of Europe	Other	Total	Per Cent
Unmanufactured wood	5	-	1	4	10	1
Manufactured wood products	389	8	24	9	430	28
Pulp, paper and paper products	1,049	17	8	18	1,092	71
Total	1,443	25	33	31	1,532	100
Per cent	94	2	2	2	100	

NOTE: Figures based on province-of-lading data.

CHAPTER III

EMPLOYMENT IMPACT OF THE FOREST INDUSTRY

The forest industry provides employment to a significant portion of the work force in Ontario and the purpose of this chapter is to assess this impact. Examining the forest industry as defined in Chapter I, the number of workers employed in the year 1978 was found to be about 78,000. But in a world where events in one industry are strongly correlated with events in other industries, it is not always possible to make hard and fast distinctions between them. Additional production in the forest industry (as in every other industry) not only creates extra jobs in this particular industry but also creates demands for inputs from other industries that supply raw materials, equipment, supplies, or services to it. Additional production and employment are thus generated in these industries as well. The stimulative impulses originating in one industry result in direct employment and earnings in that industry, and indirectly to employment and earnings in other sectors of the economy. Estimates of the relationship between "indirect" employment in the economy resulting from a given "direct" employment in the forest industry need to be made to better assess the impact of the forest industry in Ontario.

3.1 The Multiplier

In the 1969 study, the concept of a "basic" to "non-basic" employment ratio was used to estimate the indirect employment attributable to direct employment in the forest industry.

Surveys in three forest-based communities were used to arrive at the ratio in a reasonably simple and expedient manner but one can seriously question whether figures pertaining to small, single industry towns can be applied with acceptable accuracy to larger regions.

It was therefore decided to examine estimates of the employment "multiplier" arrived at in other ways before accepting or rejecting the figure used in the 1969 report. The most effective manner of accomplishing this was to utilize the input-output model for the Ontario forest products industry, prepared in the Ontario Ministry of Natural Resources during 1974.

Input-output models show how one industry in an economy uses the outputs of other industries and the primary factors of production (land, labour, and capital) to produce their own outputs, which go toward meeting the final demand composed of exports and consumer, government and investment spending. When the final demand of a certain commodity increases by a given amount then the model can trace its propagation through the structural linkages of the economy. For example, an increase of one dollar in final demand, all located in the agricultural

sector, will call forth a direct increase in the outlay on salaries and wages in the agricultural sector. However, the products of this sector cannot be produced by using only its own primary inputs. Intermediate goods and services from many other sectors will also be required for the purpose, and their production will require a further indirect outlay on salaries and wages. Thus, the total outlay in salaries and wages (direct plus indirect) will be in excess of the direct increase in salaries and wages in agriculture mentioned earlier. The ratio of the direct-plus-indirect to the direct salaries and wages generated due to a one dollar increase in final demand for agricultural products is called the "simple salary and wage multiplier" in the context of input-output models.

The Ontario Ministry of Natural Resources' forest industry input-output model recognized three primary resource sectors viz. "agriculture", "mining", and "logging, fishing and trapping"; twelve manufacturing sectors belonging to the Statistics Canada S.I.C. groupings of "Wood Industries", Furniture and Fixture Industries" and "Paper and Allied Industries"; and sixteen other sectors of broad aggregates in the provincial economy. The sectors in the model that correspond to the definition of the forest industry as used in this report and their simple salary and wage multipliers are given in Table 13.

TABLE 13

Forest Industry Sector	Multiplier
Logging, Fishing and Trapping	1.694
Sawmills	2.153
Veneer and Plywood Mills	2.207
Sash, Door and Planing Mills	2.259
Wooden Box Factories	1.905
Coffin and Casket Industry	1.525
Miscellaneous Wood Industries	2.286
Pulp and Paper Mills	2.284
Asphalt Roofing Manufacturers	2.859
Paper Box and Bag Manufacturers	2.501
Miscellaneous Paper Converters	2.814

We are concerned with roughly estimating the number of people employed in non-forest-based industries who seem to be there because the forest industry at present requires their output. This can be done if a "simple employment multiplier" can be computed for Ontario's forest industry.

From the salary and wage multipliers of the 1974 study the employment multipliers were calculated as shown in Table 14. The man-hours of employment in each sector are shown also. For the forest industry as a whole, the average employment multiplier, weighted by the actual employment in each constituent industry, was 2.08 based on the 1965 data and 2.15 based on the 1972 data.

The 1969 survey figure was 2.01 in Dryden and 2.13 in Kapuskasing/Hearst. After making rough adjustments for further inter-industry relationships that study arrived at an overall employment multiplier of 2.73 for Ontario. It was further suggested that this figure was an underestimate and that the correct multiplier was probably in excess of 3.0.

There are reasons to believe that this may not be so. In fact, the input-output model derived multipliers of 2.08 and 2.15 may be overestimates. In any case, our estimates need to be accepted with caution for the following four reasons.

1. The input-output model for the Ontario forest products industry does not take into account the leakages in income due to imports. The general effect of this is an overestimate of all multipliers.

2. The input-output model divided forest industries into fairly narrow sectors but left the rest of the economy in relatively large aggregates. This tends to distort the multipliers; overstating those pertaining to small sectors while underestimating those referring to larger sectors. The problem stems from what are called crossover effects or internal transactions made among the small forest sectors themselves. If all the economy is recognized as one giant sector then the multiplier is necessarily one. If a number of small sectors are separated from a large sector, then the weighted average multiplier of the small sectors is always more than the simple multiplier of the large sector when there are transactions among the small sectors.

We have not only caused distortions that will inflate the employment multiplier due to an aggregation of the non-forest sectors of the economy into a few large ones but also because the composite forest industry multiplier has been computed as a weighted average as shown in the preceeding paragraph.

3. The primary sector called "Logging, Fishing and Trapping" used in the model includes more than legitimate forest industry activity as defined for the purposes of this report and introduces a distortion. This, however, need not necessarily result in an overestimation of the employment multiplier, only an inaccuracy in its measurement.

4. The multiplier as described here is an average concept which is being used in a marginal sense under the input-output assumption that the average and marginal conditions are identical. On the basis of observing that for every 100 people directly employed in the forest industry there

TABLE 14

EMPLOYMENT AND EMPLOYMENT MULTIPLIERS, 1965, 1972

Sector	Employment in Forest Industry Activity (000 man-hours)		Employment Multiplier	
	1965	1972	1965	1972
Logging, Fishing & Trapping	23,244 ¹	15,861	1.694 ¹	1.921
Sawmills & Planing Mills	10,851	10,213	1.454	1.630
Veneer & Plywood Mills	5,140	4,453	1.519	1.568
Sash, Door & Other Millwork Plants	6,799	10,126	1.711	1.705
Wooden Box Factories	3,597	3,299	1.353	1.310
Coffin & Casket Industry	1,044	529	1.010	1.155
Miscellaneous Wood Industries	3,688	3,422	1.662	1.730
Pulp & Paper Mills	37,778	36,224	2.560	2.567
Asphalt Roofing Manufacturers	1,097	522	2.748	3.029
Paper Box & Bag Manufacturers	17,631	19,505	2.209	2.210
Miscellaneous Paper Converters	12,737	15,725	2.522	2.429
TOTAL	123,606	119,879	2.08	2.15

¹In 1965, the figures for the "Logging" sector were not separated from "Fishing and Trapping".

are another 108 or 115 indirectly employed in other industries, we are then concluding that an additional man-hour employed directly in the forest industry due to an increase in the demand for forest products, indirectly necessitates the employment of an additional 1.08 or 1.15 man-hours in other industries. The two statements are not necessarily simultaneously true, particularly in a rapidly changing technological and market environment.

Alternatively, it may be argued that the employment impact of the forest industry is underestimated by the employment multiplier computed from the Ontario Ministry of Natural Resources input-output model. This would be because the model does not take into account the services provided by the government sector to the forest industry and without which, it may further be argued, the outputs of the forest industry could not be produced. The full indirect impact of direct employment in the forest industry should therefore include the employment generated in and through the forest management and forest protection activities.

For the sake of convenience and in the face of uncertainty regarding such estimates it is proposed to accept, as a first approximation, the figure of 2.0 as the employment multiplier for the forest industry in Ontario. This means that for every 1.0 man-years of employment occurring directly within the forest industry, there is another 1.0 man-years of employment indirectly generated in other sectors of the economy. Adjustments will be made later in this chapter to include employment impact within the Ministry of Natural Resources.

3.2 Employment Attributable to the Forest Industry

Direct employment in the forest industry in 1978, as seen in Table 2, was 76,729. This figure included head office workers, administrative and sales personnel, and all production related workers.

In the 1969 report, head office workers, owners and partners were added to production related administrative and sales workers to get a more accurate estimate of employment in the forest industry. But from 1970 the figures for head office workers are not given separately by Statistics Canada and are included in the total employment reported. Therefore, this adjustment is not required in this report for the year 1978. An adjustment is required to account for working owners and partners which are not included in the base data. Table 15 shows the number of such owners and partners and also adjustments in the figure for logging workers as explained below.

An adjustment in logging needs to be made since the logging census questionnaire is not sent to small firms. This adjustment adds an estimated 1000 woodworkers to the forest industry employment figure. The revised employment figures are shown in Table 15.

TABLE 15

REVISED EMPLOYMENT IN THE ONTARIO FOREST INDUSTRY, 1978

	Production & Related Workers	Admin. & Sales	Working Owners & Partners	Adjust- ment	Total
Logging	8,099	1,470	162	1,000	10,731
Sawmills, Planing Mills and Shingle Mills	5,752	1,136	109		6,997
Veneer and Plywood Mills	2,020	297	-		2,317
Sash, Door and Other Millwork Plants	5,786	1,383	51		7,220
Wooden Box Factories	1,878	434	23		2,335
Coffin and Casket Industry	170	44	-		214
Miscellaneous Wood Indus- tries	2,662	384	24		3,070
Wood Industries	18,268	3,678	207	-	22,153
Pulp and Paper Mills	17,797	4,380	-		22,177
Asphalt Roofing Manufacturers	306	90	-		396
Folding Carton and Set-up Box Manufacturers	3,328	885	-		4,213
Corrugated Box Manufacturers	4,264	1,387	-		5,651
Paper and Plastic Bag Manufacturers	1,711	588	2		2,301
Miscellaneous Paper Converters	7,413	3,060	3		10,476
Paper and Allied Industries	34,819	10,390	5	-	45,214
Total	61,186	15,538	374	1,000	78,098

Prior to 1976, the logging sector employment data required an additional adjustment to compensate for a national estimate of average hours per work-week that was too high for Ontario conditions. This resulted in an upward adjustment of about 24 per cent in the number of production related workers in logging. In 1976, the basis for estimating hours per work-week was updated so this adjustment was no longer necessary.

The 1969 report estimated indirect employment due to expenditure on non-wood operating and maintenance supplies by the forest industry and capital expenditures on new works. However, no such estimates are required as the "multiplier" used in the present report takes into account all indirect effects caused by the forest industry.

Using the figure of 2.0 as the employment multiplier, 78,000 directly employed persons in the forest industry indirectly created another 78,000 jobs in other industries in the economy in 1978 and resulted in a total industrial employment of 156,000.

The only way to accurately distribute the indirect employment by economic regions is by using a regional input-output analysis for which the model is not available for this update. In the absence of any further data, the indirect employment due to the forest industry is assumed to occur in the same region as the direct forest industry employment. The distribution of direct and indirect forest industry employment is shown in Table 16.

In addition, employment in the forest management and in the forest protection activities of the Ontario Ministry of Natural Resources which may be considered attributable to the forest industry is shown in Table 16 also. Additional information on such employment is given in Table 36.

TABLE 16
MAN-YEARS EMPLOYMENT ATTRIBUTABLE TO THE FOREST INDUSTRY, 1978

	Direct Employment in the Forest Industry	Indirect Employment					Total
		Other Industries	Ontario Ministry of Natural Resources				
				Perma- nent	Casual	Sub- Total	
Northwestern Ontario	16,380	16,380	Forest Management Fire Protection	175 95	276 186	732	33,492
Northeastern Ontario	13,728	13,728	Forest Management Fire Protection	234 133	453 193	1,013	28,649
Southern Ontario	47,892	47,892	Forest Management Fire Protection	464 64	544 93	1,165	96,949
Total	78,000	78,000		1,165	1,745	2,910	158,910

CHAPTER IV

ANNUAL REVENUES AND EXPENDITURES

OF THE

ONTARIO FOREST INDUSTRY

4.1 Financial Sources and Revenues

The forest industry is becoming highly integrated in the pursuit of economies of scale, reduction of overall real costs, improved products and marketing efficiency. In particular, the major integration trend has been between sawmills and pulp and paper mills. The major reason for this is to economize on wood supply by producing the most appropriate products from the timber on the pulp and paper companies' usually extensive timber licences, and by establishing a secure and relatively inexpensive supply of chips for the pulp and paper mills from the sawmills. Changes in technology, together with the application of environmental and resource policies by governments, have increased the minimum plant size needed for efficient operations. The capital now required for construction of new facilities or to modernize existing operations and to meet environmental regulations is invariably large, in the case of new pulp mills exceeding the financial capabilities of all but the largest companies. Largely for these reasons, most pulp and paper companies in Ontario are publically held. Smaller firms, usually involved in logging, sawmilling or other wood industries are usually owned by individuals or small groups, while larger firms are generally Canadian public companies or are subsidiaries to foreign firms, principally from the United States.

Although about a dozen of the forest industry companies with a major presence in Ontario are large, they are reasonably small by world standards. According to 1978 sales figures, only one Ontario pulp and paper company (Abitibi-Price, 19th) was ranked within the top 20 largest pulp and paper companies in the world. It is interesting to note, however, that five of the top ten largest pulp and paper firms in the world have operations in Ontario.

Using value of shipments as an index of sales, the forest industry accounts for 6.5 per cent of Ontario manufacturing industry sales. In comparison, the Transportation Equipment, Food and Beverage, Primary Metal, and Petroleum and Coal Products industries accounted for 22.4, 13.1, 9.1 and 5.2 per cent, respectively, of total manufacturing industry sales in Ontario. Values of shipments of Ontario's major industry groups are presented in Table 17 for 1977 and 1978.

TABLE 17

VALUE OF SHIPMENTS FOR ONTARIO MANUFACTURING INDUSTRIES

Industry Groups	1977		1978	
	Value of Shipments (Million \$)	%	Value of Shipments (Million \$)	%
Wood Industries	870	1.6	1,078	1.7
Paper and Allied Industries	2,827	5.1	3,146	4.8
Sub-Total Forest Industry Manufacturing	3,697	6.7	4,224	6.5
Food and Beverage	7,474	13.4	8,557	13.1
Tobacco Products	521	0.9	557	0.9
Rubber and Plastic products	1,646	3.0	1,983	3.0
Leather	367	0.7	463	0.7
Textile	1,390	2.5	1,602	2.5
Knitting Mills	183	0.3	213	0.3
Clothing	614	1.1	755	1.2
Furniture and Fixtures	743	1.3	868	1.3
Printing, Publishing and Allied	1,748	3.1	2,049	3.1
Primary Metal	4,937	8.9	5,904	9.1
Metal Fabricating	4,439	8.0	5,115	7.9
Machinery (except electrical)	2,827	5.1	3,367	5.2
Transportation Equipment	12,430	22.4	14,577	22.4
Electrical Products	3,245	5.8	3,587	5.5
Non-metallic Mineral Products	1,378	2.5	1,647	2.5
Petroleum and Coal Products	2,605	4.7	3,378	5.2
Chemicals and Chemical Products	3,832	6.9	4,377	6.7
Miscellaneous Manufacturing	1,516	2.7	1,887	2.9
Sub-Total Other Industry Groups	51,874	93.3	60,888	93.5
TOTAL All Industry Groups	55,591	100.0	65,112	100.0

4.2 Operating Expenditures by Sectors

Table 18 presents details of these data for the industrial sectors and for selected years. There are four main groups of expenditures, three of which are self-evident. The fourth, called 'others' includes depreciation, taxes, return on capital, most non-operating overhead and some prepaid freight. Due to the fact that sales of one sector become purchases of another sector, there is inevitably some double counting in these figures.

4.3 Capital and Repair Expenditures

The capital and repair expenditures since 1950 in Logging, the Wood Industries, and the Paper and Allied Industries are shown in Figure 6.

Average annual expenditures for 1976 to 1978 are given in Table 19. The annual amount of \$488 million represents 4.9 per cent of total investment in manufacturing in Ontario.

4.4 Transportation

On average, approximately four tons of raw materials and supplies are delivered to the processing plants in the forest industry for each ton of primary finished product shipped out. Thus, transportation is of considerable economic significance, and the discussion that follows is designed to reveal the approximate tonnages of major goods hauled to and from the mills, the mode of transportation employed, distance traversed, rate structure and revenue generated.

Freight inbound to the mills

Roundwood is by far the largest item of inbound freight. In 1978 approximately 712 million cubic feet was produced of which 561 million cubic feet was softwood. Using the density factors of 55 and 75 pounds per cubic foot, including bark, for softwoods and hardwoods respectively, 15.4 million tons of softwoods and 5.7 million tons of hardwoods, or 21.1 million tons in total, are estimated to have been delivered to mills.

The growth in production of, and trade in, pulp chips as by-products of Ontario sawmills and veneer mills has been remarkable, as indicated below:

1960	0.15	million bone dry tons				
1965	0.41	"	"	"	"	"
1970	0.77	"	"	"	"	"
1973	1.36	"	"	"	"	"
1976	1.47	"	"	"	"	"
1978	1.88	"	"	"	"	"

TABLE 18
ESTIMATED DISTRIBUTION OF ONTARIO
FOREST INDUSTRY EXPENDITURES IN RELATION
TO VALUE OF SHIPMENTS, 1969, 1973 and 1978

(Million \$)

Sector	Year	Fuel and Elec- tricity	Raw Materials		Operating and Maintenance Supplies	Containers and Packaging	Office Supplies	Wages and Salaries	Others	Value of Shipments
			Wood	Non- Wood						
Logging	1969	7	73	-	23	-	-	80	28	211
	1973	8	81	-	32	-	-	99	35	255
	1978	15	160	-	84	-	-	180	66	505
Wood Industries	1969	6	127	42	8	1	1	96	61	342
	1973	11	171	80	17	2	1	154	145	581
	1978	28	367	124	35	4	2	279	236	1,075
Paper Allied Industries	1969	54	435	137	51	31	3	317	271	1,299
	1973	75	546	221	56	32	4	436	378	1,748
	1978	229	1,014	418	111	58	5	613	698	3,146
Total Forest Industry	1969	7	635	179	82	32	4	493	360	1,852
	1973	94	798	301	105	34	5	689	558	2,584
	1978	272	1,541	542	230	62	7	1,072	1,000	4,726

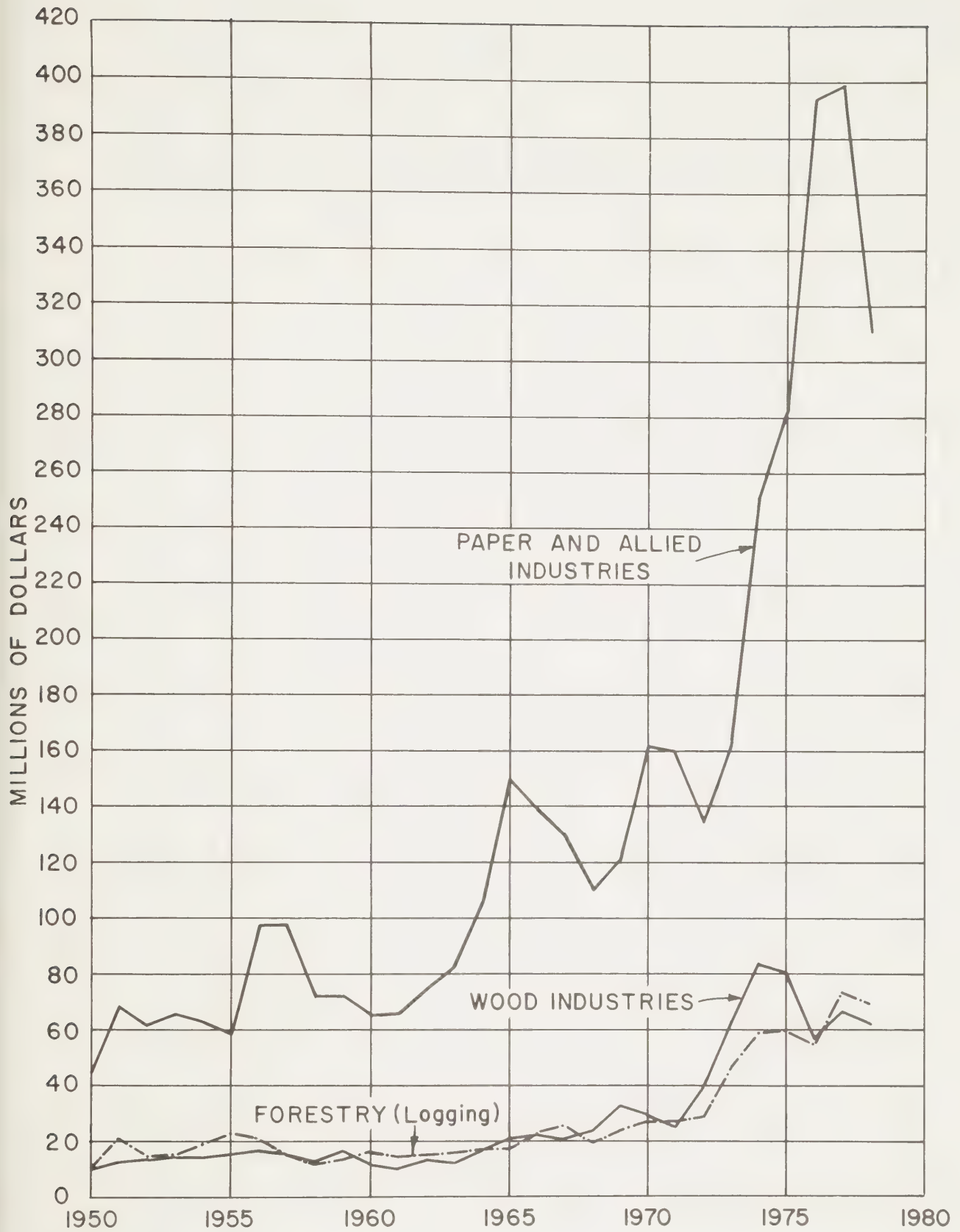


FIGURE 6. FOREST INDUSTRY CAPITAL AND REPAIR EXPENDITURES, ONTARIO.

TABLE 19

ONTARIO FOREST INDUSTRY, CAPITAL AND REPAIR EXPENDITURES

ANNUAL AVERAGE FOR 1976-1978

(Million \$)

	Logging	Wood Industries	Paper & Allied Industries	Total
Capital				
Construction, Machinery, and Equipment	6.73	10.20	39.80	56.73
	16.67	25.47	173.90	216.04
SUB-TOTAL	23.40	35.67	213.70	272.77
Repair				
Construction, Machinery, and Equipment	6.17	4.03	14.37	24.57
	39.83	22.77	127.57	190.17
SUB-TOTAL	46.00	26.80	141.94	214.74
Capital and Repair				
Construction, Machinery, and Equipment	12.90	14.23	54.17	81.30
	56.50	48.24	301.47	406.21
TOTAL	69.40	62.47	355.64	487.51

Since pulp chips are usually shipped green, with a unit volume weight twice that of dry chips, the inbound freight, after adjustment for inplant transfers, is estimated at 2.5 million tons in 1978. The volume of roundwood, chips and other residues brought into Ontario from other provinces and the United States is estimated to be 59 million cubic feet as shown in Table 1. Most of this material was softwood. Using a density of 55 pounds per cubic foot of solid wood, the weight is 1.62 million tons.

Operating supplies going to the mills are also freight items. In 1972, 1.16 million tons of coal and petroleum fuel, 0.82 million tons of chemicals, and 0.42 million tons of machinery, equipment, containers, packaging, etc. were estimated to have been moved in Ontario. In the same year, an estimated 21.48 million tons of Ontario-produced roundwood, imported wood and chips were transported in the Province. Using the same ratios as existed in 1972 between weights of nonwood and wood inputs, the quantities of fuel, chemicals and machinery, etc. moved in 1978 are estimated at 1.83, 0.94, and 0.48 million tons, respectively.

The total inbound freight in 1978 was therefore 28.53 million tons.

Freight Outbound from the Mills

To avoid double counting, only primary products are included in the following estimate.

Paper and paperboard production in 1978 amounted to 3.55 million tons. This was made up of 1.84 million tons of newsprint, 0.75 million tons of paperboard and 0.97 million tons of miscellaneous papers. In addition, 0.93 million tons of pulp were exported from the Province. It is estimated that at least 0.95 million tons of pulp grades were shipped out of Ontario without further manufacture.

In 1978, about 1.38 billion board feet of softwood and 0.24 billion board feet of hardwood lumber were produced. Using average shipping weights, the total weight of lumber shipped is estimated to be 2.20 million tons. Plywood production was 202 million square feet (1/4" equivalent thickness). At 800 pounds per thousand square feet, the plywood weight is 80,760 tons. In addition, 737 million square feet of veneer weighing about 73,710 tons was produced. Since a good share of this veneer is included in the plywood total just given, the combined weight estimate is 110,000 tons for the year.

The total outbound shipment of primary products thus totals 6.99 million tons.

Total Freight

The inbound and outbound freight tonnages are summarized in Table 20. The ratio of primary products to other traffic is 1:4.1, which means that for every ton of primary product

TABLE 20
APPROXIMATE TONNAGE OF FREIGHT CARRIED
FOR
THE FOREST INDUSTRY, BY MAJOR COMMODITY, 1978

COMMODITY	Million Tons	Per Cent
<u>Raw Materials</u>		
Roundwood harvested in Ontario	21.12	
Pulp chips produced in Ontario	2.54	
Imported roundwood and chips	1.62	
SUB-TOTAL	25.28	71.2
<u>Other Supplies and Equipment</u>		
Coal and petroleum fuels	1.83	
Chemicals	0.94	
Machinery and Others	0.48	
SUB-TOTAL	3.25	9.1
<u>Primary Products</u>		
Newsprint	1.84	
Other paper and board	1.71	
Pulp	0.95	
Lumber	2.20	
Veneer and plywood	0.11	
SUB-TOTAL	6.99	19.7
TOTAL	35.52	100

shipped from the mills by the forest industry, another 4.1 tons is moved into the mills in the form of wood, raw materials, and other supplies and equipment.

Table 21 shows a breakdown of the several classes of forest industry goods transported by kind of carrier, both in tons and percentages. For comparison, 1966 and 1973 percentages are included and these indicate that trucking is competing very well with rail and water carriers. A further comparison of interest is that total rail freight loaded in Ontario in 1978 amounted to 51.86 million tons of which crude and manufactured forest products were 7.72 million tons, representing 14.9 per cent of total rail freight activity.

Freight Revenue

It is very difficult to get an accurate, or even precise, measure of the total freight revenue earned by public carriers in Ontario for the movement of products to and from forest industry operations. Even if accurate average distances and freight rates for different goods and carriers could easily be determined, this would not accurately reflect freight revenue generated because freight rates, especially rail, are negotiated for each company and situation. Freight revenues also vary greatly from year to year depending on the volume of mill production and shipments, the amount of capital construction and equipment acquisition, and, in the case of the logging industry, the part of their limits the company is operating for that particular year. Notwithstanding this, as in the 1969 study, a crude estimate is made for the purpose of judging the impact of the Ontario forest industry on the Province's transportation sector.

In the 1977 report, the estimated revenue generated by rail freight was \$151 million. After adjustments for the amount of freight carried and inflation, the corresponding freight revenue for 1978 is approximately \$270 million.

For the truck hauling of raw wood, an average rate of 25 cents per cunit-mile was assumed. Further assumptions were that 82 per cent of all wood was truck-hauled; that 20-30 per cent of this wood was trucked commercially; and that the average distance hauled was 70 miles. The revenue to commercial truckers in this activity was estimated to be \$24 million. In the absence of more definitive data, the total truck revenue including that from the hauling of chips, lumber, plywood and supplies of various kinds was taken as three times the revenue in public trucking of raw wood, or \$72 million. This proportion is the same as used in the 1969 report.

Again, as in the 1969 report, the revenue from water transportation was taken as 2.5 per cent of the total revenue from rail and truck transport, or \$9 million.

TABLE 21
FREIGHT GENERATED BY THE ONTARIO FOREST INDUSTRY
BY CARRIER, 1978

(Million tons)

	Rail	Truck	Water	Total
Wood Raw Material	4.42	19.91	.06	24.39
Primary Products	3.30	3.59	.08	6.97
Equipment and Supplies	1.94	1.10	.21	3.25
Total	9.66	24.6	0.35	34.61
Percentages - 1978	28	71	1	100
- 1973	27	71	2	100
- 1966	39	56	5	100

In summary, the total freight revenue in 1978 was estimated as;

Rail	\$270 million
Truck-commercial	24 million
-private	48 million
Water	9 million
All carriers	\$351 million

4.5 Origin of Goods Purchased by the Forest Industry

Using the same proportion as in the 1969 and 1977 reports, the origin of "Operating and Maintenance" supplies and "Capital and Repair" supplies for 1978 is shown in Table 22.

4.6 Energy Utilization in the Ontario Forest Industry

The forest industry is not a large energy consumer with the exception of the pulp and paper mills. This sector is the largest energy-consuming forest industry and is the second largest energy-consuming manufacturing industry, consuming about 14 per cent of the Ontario manufacturing industry energy. Energy consumption as a percentage of total Ontario manufacturing industry consumption is shown in Table 23 for forest-based manufacturing industries relative to the largest energy-consuming manufacturing industries in Ontario.

Most manufacturing industries are not very energy intensive. The energy cost per thousand dollars of value added is shown in Table 24 as a measure of intensity of energy use. With the exception of the pulp and paper industry, the forest industries are comparable in energy intensiveness to the average of all Ontario manufacturing industries. The pulp and paper mills ranked fifth among energy intensive¹ manufacturing industries in the Province. It had an energy expenditure of \$283 per thousand dollars of value added in 1978. Since a large proportion of pulp and paper production is exported, this implies a large export component of energy from the Province.

¹ Ontario Ministry of Treasury and Economics defines an energy intensive industry as one having an energy expenditure per thousand dollars of value added as three times the average for all Ontario manufacturing industries.

TABLE 22
ORIGIN OF NON-WOOD PURCHASED GOODS & SERVICES, 1978

(Million \$)

Origin	Capital & Repair	Per cent	Operating & Maintenance	Per cent	Total	Per cent
Northern Ontario	7.31	1.5	7.13	3.1	14.44	2.1
Southern Ontario	174.53	35.8	154.33	67.1	328.86	46.2
Western Canada	14.63	3.0	16.79	7.3	31.42	4.5
Eastern Canada (excluding Ontario)	196.47	40.3	34.50	15.0	230.97	31.8
Imports	94.58	19.4	17.25	7.5	111.83	15.4
Total	487.51	100.0	230.00	100.0	717.51	100.0

TABLE 23

PERCENTAGE CONSUMPTION OF ENERGY OF ONTARIO FOREST INDUSTRY MANUFACTURING
RELATIVE TO THE LARGEST ONTARIO MANUFACTURING ENERGY USERS, 1978

(per cent of total Ontario manufacturing industry consumption)

MAJOR GROUP & INDUSTRY GROUPS	Total All Sources	Fuel Oil	Gasoline	Natural Gas	Electricity	Coal
Industrial Chemicals	15.93	10.71	1.12	16.20	9.88	0.23
Pulp & Paper Mills	13.70	12.68	1.13	15.63	14.38	28.05
Iron & Steel Mills	13.72	21.90	1.52	14.42	13.21	-
Smelting & Refining	4.02	4.66	0.31	3.24	5.29	4.27
SUB-TOTAL Largest Energy-Using Industries	47.37	49.95	4.08	49.49	42.76	32.55
Sawmills & Planing Mills	0.76	1.68	3.94	0.25	0.80	-
Veneer & Plywood Mills	0.14	0.12	0.32	0.14	0.16	0.04
Sash, Door & Other Millwork	0.28	0.27	2.22	0.13	0.33	-
Wooden Box Factories	0.10	0.19	0.56	0.04	0.08	-
Coffin & Casket Industry	0.01	0.01	0.12	0.00	0.01	-
Miscellaneous Wood Industries	0.52	0.20	0.37	0.64	0.46	-
SUB-TOTAL Wood Industries	1.80	2.47	7.53	1.21	1.83	0.04
Pulp & Paper Mills	13.70	12.68	1.13	15.63	14.38	28.05
Asphalt Roofing Manufacturers	0.07	0.10	0.04	0.11	0.04	-
Paper Box & Bag Manufacturers	0.58	0.31	1.78	0.54	0.72	-
Miscellaneous Paper Converters	0.54	0.23	0.72	0.61	0.68	-
SUB-TOTAL Paper & Allied Industries	14.89	13.31	3.67	16.90	15.81	28.05
SUB-TOTAL: Forest Industry Manufacturing	16.69	15.78	11.20	18.11	17.64	28.09

TABLE 24

ONTARIO FOREST INDUSTRY ENERGY

EXPENDITURE PER \$000 OF VALUE ADDED

INDUSTRY	1977		1978	
	Total Value Added (Million \$)	Energy Cost per \$000 Value Added	Total Value Added (Million \$)	Energy Cost per \$000 Value Added
Logging	229	55	251	60
Sawmill & Planing Mills	136	69	197	60
Veneer & Plywood Mills	27	64	47	46
Sash, Door & Other Millwork	131	29	147	29
Wooden Box Factories	52	27	44	33
Coffin & Casket Industry	3	31	4	32
Miscellaneous Wood Industries	54	114	72	110
Wood Industries	405	56	511	54
Pulp and Paper Mills	682	266	742	283
Asphalt Roofing Manufacturers	18	77	19	56
Paper Box and Bag Manufacturers	254	30	288	31
Miscellaneous Paper Converters	239	28	257	32
Paper & Allied Industries	1,193	165	1,306	175
All Manufacturing Industries	22,555	58	25,911	59

The composition of the energy consumption of the forest industry is shown in Table 25. In the logging industry, fuel oil and gasoline account for 95 per cent of the purchased energy in terms of value of energy purchases. This reflects the large transportation and heavy, mobile equipment components of the logging industry.

In the wood industries, purchased electricity accounts for 40 per cent of energy requirements, with natural gas and fuel oil comprising about 20 per cent each. Electricity is used mostly for lighting and mechanical power, while the fuel oil and natural gas are used mainly to generate heat for space heating, kiln drying of lumber and drying and pressing of reconstituted wood board products. In the paper and allied industries, natural gas accounts for 43 per cent of purchased energy, and electricity for another 40 per cent. Again, electricity is used mainly for lighting and mechanical power while the natural gas is used mainly for process heat, pulp and paper drying and space heating.

4.7 Energy Generation in the Ontario Forest Industry

The forest industry has always supplied at least a portion of its energy requirements. In the past, forest industry establishments have usually been located near rivers where there exists the potential to harness power, first directly by mechanical means and later by the generation of electricity. No statistics are available on self-generation of electricity by the forest industry, but it is known to be a considerable portion of its energy requirements. Very little electricity is generated by the burning of conventional fossil fuels, most being produced by generating facilities powered by water or the burning of wood mill residue.

As energy prices continue to rise, increasing attention is turned to substituting mill wood residue for other types of fuel in mills. The feasibility of this substitution depends on the energy requirements of the mill, the amount of wood residue that is produced or can be economically obtained, costs of installing the wood burning facilities, and the price of other types of energy.

In 1979, sawmills burned 14 per cent of their wood residue for fuel, sold 44 per cent as fibre and fuel, and burned as waste about 42 per cent. In sawmills, as in other wood industries, there is usually limited additional opportunity to substitute wood for other forms of energy since most mills produce more residue than they can utilize, and the smaller establishments often cannot afford the capital costs of a residue utilization system.

The largest opportunity for replacement of fossil fuels with wood residue lies with the pulp and paper mills even though they currently utilize most of their burnable residue. These mills produce about 35 per cent of forest industry

TABLE 25
FUEL AND ENERGY CONSUMPTION
BY THE
ONTARIO FOREST INDUSTRY, 1978

	Logging	Wood Industries	Paper and Allied Industries	Total
FUEL OIL				
Volume (000 gal)	18,710	8,719	71,813	99,242
Value (000 \$)	10,951	5,592	28,405	44,948
Per cent of all energy forms	73	20	13	17
GASOLINE				
Volume (000 gal)	4,195	4,052	1,960	10,207
Value (000 \$)	3,251	3,605	1,757	8,613
Per cent of all energy forms	22	13	1	3
NATURAL GAS				
Volume (million ft ³)	56	3,499	50,088	109,640
Value (000 \$)	121	7,576	96,396	104,093
Per cent of all energy forms	1	23	43	39
LIQUID PETROLEUM GAS				
Volume (000 gal)	508	959	1,288	2,755
Value (000 \$)	310	551	776	1,637
Per cent of all energy forms	2	2	-	1
COAL				
Volume (tons)	-	300	205,430	205,730
Value (000 \$)	-	9	6,032	6,041
per cent of all energy forms	-	-	3	2
ELECTRICITY				
Volume (million KWH)	15	445	5,412	5,872
Value (000 \$)	412	10,179	89,541	100,332
Per cent of all energy forms	3	37	40	38
TOTAL VALUE (000\$)	15,045	27,512	222,907	265,664
Per cent of all energy forms	100	100	100	100

mill residue but consume 89 per cent of the total forest industry fossil fuel. A large opportunity for replacement of fossil fuels with mill wood residues exists if additional residue can be economically acquired from off-site sawmills or veneer mills.

Currently, approximately 17 per cent of the forest industry fossil fuel requirements are being met by mill wood residue. If all mill residue currently incinerated or buried for landfill were utilized for fuel, this would raise forest industry energy self-sufficiency from 17 per cent to about 26 per cent. Actually, considering transportation costs and residue utilization system capital costs, it is only feasible at present to raise this from 17 to about 22 per cent. If conventional energy prices were to double, it would be feasible to burn wood residue at each mill site; however, it still would not be feasible to utilize the energy from all of the mill wood residue in the Province. Where the energy value of the residue produced is greater than the mill's requirements, the residue can only be utilized if it, or the energy produced, can be economically shipped to another mill. Nevertheless, mill wood residue is already a cost effective fuel in a few cases and it will be utilized considerably more in the future to replace increasingly expensive fossil fuels and electricity.

There still exists a large potential energy source in the form of logging wood residue that is now left in the woods. As the price of other energy rises, it will at some point become economically feasible to gather and transport portions of this residue to a facility where it can be utilized. At present, however, the acquisition cost of such residue outweighs the energy value that can be obtained by utilizing it.

CHAPTER V

PUBLIC REVENUES AND EXPENDITURES RELEVANT

TO THE ONTARIO FOREST INDUSTRY

The objective of the first part of this chapter is to quantify the taxes and other revenues that flow to both provincial and federal governments by virtue of the existence of the Ontario forest industry. The measurements are made both directly and indirectly, as determined by the nature of available statistical information. Discussion is organized under six revenue classes.

5.1 Ministry of Natural Resources Revenues

It should be clearly understood what is meant by this heading. Like all other ministries, Natural Resources may collect money on behalf of the Crown within the scope of its assigned responsibilities and functions, but all such monies are, with very limited exceptions, payable to the Provincial Treasurer who deposits them in a common account (The Consolidated Revenue Fund). By the same token, Ministry expenditures are restricted in kind and amount to the budgets approved by the Legislative Assembly. Thus, it should be evident that while we may talk of a ministry's revenues and expenditures, it is the government, formed from elected representatives, that wields ultimate control through acts, regulations and budget allocations. It should also be evident that one cannot attempt to relate ministerial revenues to expenditures, and vice versa, in the same sense that is commonly applied to business in the private sector.

Table 26 shows revenues generated by the Ministry of Natural Resources by major activities over a seven-year period. The forest industry contributes principally to the Timber Account, and it may be noted that stumpage (i.e. the payment for harvested Crown timber) consistently constitutes 80 to 90 per cent of this item. As an aside, it may be mentioned that stumpage provides a good example of semantic difficulty; some people prefer to view it as a tax levied on the logging industry while others prefer to view it as value in exchange for a commodity.

Management and Forest Protection charges, now consolidated into one charge called the area charge, is a fixed charge based on the area of productive Crown forest land held under Crown timber licence. The unit rates for the fixed charge were increased in 1968 and 1978, while the stumpage rates were increased in 1974 and were indexed to forest product commodity prices in 1978.¹

¹ Crown Timber Act, amended to December 1978.

TABLE 26

ONTARIO MINISTRY OF NATURAL RESOURCES REVENUE, 1973 - 1978
(Thousand \$)

Source of Revenue	1973	1974	1975	1976	1977	1978
Timber Stumpage	14,580	20,015	23,836	25,924	30,776	37,194
Area Charge	2,016	1,971	2,598	1,884	2,232	1,833
Nursery Tree Sales	245	201	182	175	213	242
Miscellaneous	789	921	493	707	1,312	1,387
Timber, Sub-Total	17,630	25,108	27,109	28,690	34,533	40,656
Fish and Wildlife	10,734	11,379	11,536	11,747	11,903	12,428
Lands	2,084	2,449	14,785	15,701	16,283	19,007
Parks	6,211	6,617	6,852	6,743	7,050	9,902
Mining	49,201	155,201	65,410	43,747	25,243	45,114
Other	3,763	2,395	2,713	2,718	4,721	2,294
Total	89,623	201,149	128,405	109,346	99,733	129,401

5.2 Corporation Income Tax Revenue

Although Statistics Canada publishes considerable information on taxable incomes and income taxes paid by various industrial sectors, none of the statistics are directly usable for the purposes of this report. Therefore, corporation income taxes paid by the Ontario forest industry must be estimated indirectly. To this end, three separate estimating methods were prepared, as follows:

1. It was assumed that the corporation income taxes, both federal and provincial, paid by each division of the forest industry in each province, were proportional to their taxable incomes.
2. The tax rate was applied directly to the taxable incomes.
3. The average of percentages on value added, industry employment and selling value of manufactured products was used to prorate the total declared taxes in Canada to the Ontario forest industry.

Each of these methods has built-in misjudgements, but the second method is probably the most reliable. Therefore, the results of this approach were adopted for this report and are given in Table 27.

5.3 Personal Income Tax Revenues

Once again, an indirect approach was necessary and the following two methods of obtaining an estimate were attempted:

1. The first method consisted of taxes paid on the average wages and salaries earned by forest industry employees. The following two assumptions are implicit in this method:
 - (a) that forest industry employees do not have other sources of income and therefore wages and salaries may be treated as assessed income; and
 - (b) that taxes paid by forest industry employees are in proportion to their number in each income class in the Province.
2. This method was based on the percentage of the total provincial taxable returns sent in by the forest industry employees.

The implicit assumption here is that all employees of the forest industry have filed tax returns. The calculation of this method is presented in Table 28.

TABLE 27

CORPORATION INCOME TAX - METHOD 2, 1970 - 1978

Year	Ontario Taxable Income (Million \$)	Tax Rate (Net Per Cent)			Tax Estimate (Million \$)		
		Federal ¹	Prov.	Total	Fed- eral	Prov.	Total
1970	70	41	12	53	28.7	8.4	37.1
1971	54	33	12	45	17.8	6.5	24.3
1972	71	33	12	45	23.4	8.5	31.9
1973	157	30	12	42	47.1	18.8	65.9
1974	304	30	12	42	91.2	36.5	127.7
1975	142	30	12	42	42.6	17.0	59.6
1976	108	30	12	42	32.4	13.0	45.4
1977	119	30	12	42	35.7	14.3	50.0
1978	281	30	12.3	42.3	84.3	34.6	118.9

¹ Prior to 1972, the income limit had been \$35,000 for Canadian-controlled private corporations; in 1972, the limit was increased to \$50,000.

TABLE 28

PERSONAL INCOME TAX - METHOD 2
(Million \$)

(1) Year	(2) Number of Taxable Returns	(3) Ontario Forest Industry Employment	(4) Column 3 as a per cent of Column 2	Canada Pension Plan Contributions		Federal Tax		Provincial Tax		Total Income Tax		Unemployment Insurance Premium	
				All Employees	Forest Industry Employees	All Employees	Forest Industry Employees	All Employees	Forest Industry Employees	All Employees	Forest Industry Employees	All Employees	Forest Industry Employees
1973	3,462,799	78,000	2.3	252.6	5.8	4,155.3	95.6	1,383.2	31.8	5,538.5	127.4	151.1	3.5
1974	3,625,502	81,000	2.2	306.9	6.8	4,825.0	106.2	1,638.5	36.1	6,463.5	142.2	263.5	5.8
1975	3,187,655	76,000	2.4	338.1	8.1	5,314.9	127.6	1,838.1	44.1	7,153.0	171.7	300.7	7.2
1976	3,302,716	75,000	2.3	387.1	8.9	5,995.0	137.9	2,045.2	47.0	8,040.2	184.9	395.0	9.1
1977	3,349,336	73,000	2.2	434.4	9.6	5,734.2	126.2	2,910.8	64.0	8,645.0	190.2	400.3	8.8
1978	3,299,466	78,000	2.4	477.9	11.5	5,951.3	142.8	3,120.4	74.9	9,071.7	217.7	431.3	10.4

Each of these methods contains biases, but the second method is thought to be more reliable. Therefore, the estimate obtained with the second method is carried forward to the summary table.

5.4 Provincial and Federal Sales Taxes

The 1969 study estimated that approximately 70 per cent of the total retail sales tax was paid on purchases made by individuals and 30 per cent was paid on purchases made by business. Assuming these figures to be still applicable, Table 29 derives the sales taxes paid by forest industry employees.

For calculating the retail sales taxes paid by business, it was assumed that 15 per cent of the purchases made by the firms were taxable. Table 18 shows that the purchases made by forest industry firms during 1978 were \$3,654 million of which \$548 million is estimated to be taxable. Using a 7 per cent retail sales tax rate the estimated retail sales tax paid by the forest industry firms was \$38 million for 1978.

The federal manufacturers' sales tax was 11 per cent in 1966 and was raised to 12 per cent in 1967. This rate has continued to the present time with the exception that tax on most building materials remained at 11 per cent until 1974. In 1975, sales tax on all building and construction material was reduced to 5 per cent. Also, since 1967 there has been no sales tax on production machinery. Thus, not all purchases made by the forest industry are taxable. The purchases of the forest industry (excluding wood, fuel and electricity) amounted to \$1,841 million in 1978. Assuming 10 per cent as taxable and using an average rate of 10 per cent gave an estimated \$18 million for 1978.

Purchases of fuel and electricity by the forest industry are shown in Table 25 for 1978. In that year, electricity and all fuels other than diesel fuel and gasoline were exempt from federal, provincial and local taxes in Ontario. Per gallon of gasoline, there was a 19 cent provincial tax, a federal sales tax of 4.198 cents and a federal excise tax of 9 per cent.¹ The provincial and federal excise taxes were refundable for off-highway use. If it is estimated that 95 per cent of the forest industry's use of gasoline was off-highway, then the taxes paid to the Province were \$818,000 and taxes to the federal government amounted to \$400,000 in 1978.

Provincial taxes on diesel fuel were 25 cents per gallon, refundable for off-highway use, and federal taxes of 4.618 cents per gallon. Again, assuming 95 per cent of use was off-highway, taxes accruing to the Province were \$562,000 and taxes accruing to the Federal Government were \$2,077,000 in 1978.

¹ Average for the year.

TABLE 29

THE GENERAL RETAIL SALES TAX, 1970 - 1978
(Million \$)

Year	Total Provincial Retail Sales Tax Revenue	Retail Sales Tax Paid by Individuals (70% of total Retail Sales Tax)	Proportion of Ontario Employment in the Forest Industry (per cent)	Tax Paid by Forest Industry Employees
1970	674	472	2.4	11.3
1971	759	531	2.4	12.2
1972	895	627	2.3	14.4
1973	1,315	921	2.3	21.2
1974	1,569	1,098	2.2	24.2
1975	1,328	930	2.4	22.3
1976	1,775	1,243	2.3	28.6
1977	1,927	1,349	2.2	29.7
1978	1,717	1,202	2.4	28.8

5.5 Miscellaneous Taxes

There are additional provincial and federal taxes which produce revenue, but there is no method of determining the forest industry share of these items. Included in this group are motor vehicle licences, succession duties, tobacco tax and land transfer tax.

The federal import duty payable on machinery and supplies purchased by the forest industry is estimated as in the 1969 report. Duty at the rate of 10 per cent was calculated on one-half of the value of imported equipment shown in Table 22 of the present study. The amount of duty was in the order of \$5.6 million in 1978.

5.6 Tax Revenues Generated in Other Industries

It was estimated that every job in the forest industry generates another job in other industries. This expansion rate, when applied to personal income tax and retail sales tax, results in the revenues shown in Table 30.

The contents of this part of Chapter V are recapitulated in Table 31.

5.7 Ministry of Natural Resources Expenditures

In this part of Chapter V, attention is directed to expenditures by the Ontario Ministry of Natural Resources. After a brief look at the pattern of total spending by programs and services, the focus is turned to expenditures on administration and management of the resources sustaining the forest industry. Ownership of approximately 91 per cent of all forest land in Ontario has been retained in the Crown and these lands form the principal source of raw wood materials that the forest industry utilizes in the manufacture of needed consumer goods. It is the responsibility of this Ministry to protect the timber and to conserve the productivity of the forest in the best interests of all people of the Province, while nurturing a viable industry. Of course, one should try to appreciate that the forest is very versatile in its ability to satisfy human wants. While timber is being grown for commercial and industrial purposes, the forests are providing a host of other services. Thus, money spent ostensibly on timber production will, at the same time, provide the people with a great many additional benefits. For this reason, it is difficult to speak definitively about classes of expenditures.

TABLE 30

PERSONAL INCOME TAX AND GENERAL RETAIL SALES TAX

PAID BY INDIRECT EMPLOYEES, 1970 - 1978
(Million \$)

Year	Personal Income Tax		Old Age Security Tax	Unemployment Insurance Premium	Sales Tax
	Provincial	Federal			
1970	20.5	58.5	11.0	-	11.3
1971	23.0	64.5	11.9	-	12.2
1972	25.9	85.0	-	2.5	14.4
1973	31.8	95.6	-	3.5	21.2
1974	36.1	106.2	-	5.8	24.2
1975	44.1	127.6	-	7.2	22.3
1976	47.0	137.9	-	9.1	28.6
1977	64.0	126.2	-	8.8	29.7
1978	74.9	142.8	-	10.3	28.8

TABLE 31

PROVINCIAL AND FEDERAL REVENUES GENERATED AS A RESULT OF FOREST INDUSTRY ACTIVITY IN ONTARIO
1969, 1973 and 1978
(Million \$)

Reference	1969		1973		1978	
	Federal	Provincial	Federal	Provincial	Federal	Provincial
5.1 Ministry of Natural Resources	-	20.2	-	17.7	-	40.7
- Logging Income Tax ¹	-	1.4	-	-	-	-
5.2 Corporate Income Tax	40.1	11.8	47.1	18.8	84.3	34.6
5.3 Personal Income Tax	63.1	19.1	99.1	31.8	142.8	74.9
5.4 Provincial Retail Sales Tax	-	11.1	-	21.2	-	28.8
(a) Individual	-	n.a.	-	18.0	-	38.0
(b) Industry	n.a.	-	10.0	-	18.0	-
Federal Sales Tax	n.a.	n.a.	0.5	0.9	2.4	1.4
Gasoline Tax	n.a.	-	2.5	-	5.6	-
5.5 Import Duty	-	-	-	-	-	-
DIRECT REVENUE	103.2	63.6	159.2	108.4	253.1	218.4
5.6 Personal Income Tax	63.1	19.1	99.1	31.8	142.8	79.4
Provincial Retail Sales Tax	-	11.1	-	21.2	-	28.8
INDIRECT REVENUE	63.1	30.2	99.1	53.0	142.8	108.2
TOTAL REVENUE	166.3 (5.0)	93.8 (6.0)	258.3	161.4	395.9	326.6
FEDERAL PROVINCIAL TOTAL REVENUE DISTRIBUTION %	63	37	62	38	55	45

¹Logging income tax discontinued in 1972. n.a. means not available; - means not applicable.
A number in brackets is an estimate of figure n.a.

Four operating programs are recognized by the Ministry of Natural Resources for administrative and accounting purposes. Table 32 shows the expenditures by these programs for the fiscal year ending March 31, 1979. The history of expenditures is traced in Figure 7.

TABLE 32

ONTARIO MINISTRY OF NATURAL RESOURCES EXPENDITURES
(1978-1979)

Programs	Amount (Million \$)	Per Cent
Ministry Administration	24.7	10.4
Land Management	92.2	38.9
Outdoor Recreation	60.8	25.7
Resource Products	59.1	25.0
TOTAL	236.8	100.0

Ministry expenditure directed mainly to the objective of growing trees and making them available to users are classified internally as (i) Forest Management expenditures and (ii) Environmental Protection expenditures. Expenditures classified to these two operations are given in Tables 33 and 34 for each fiscal year from 1971-72 through 1978-79.

The expenses shown in Tables 33 and 34 are not, of course, amounts spent by the Provincial Government solely for the purpose of growing trees. For example, the forest access roads are used not only by those who harvest timber but also by recreationists and other members of the public. Similarly, the amounts spent on "Environmental Protection" are not all attributable to the timber values involved but, to a large extent, for the protection of life and property in towns close to forested areas and for preservation of recreational and environmental values of the forests. It is, therefore, only reasonable to assign only a part of some of these expenses to the activity of timber growing. There is no known method for correctly apportioning joint costs to the constituent activities so a subjective assignment of these costs to timber growing has been made. Such percentages and the associated amounts are shown in Table 35.

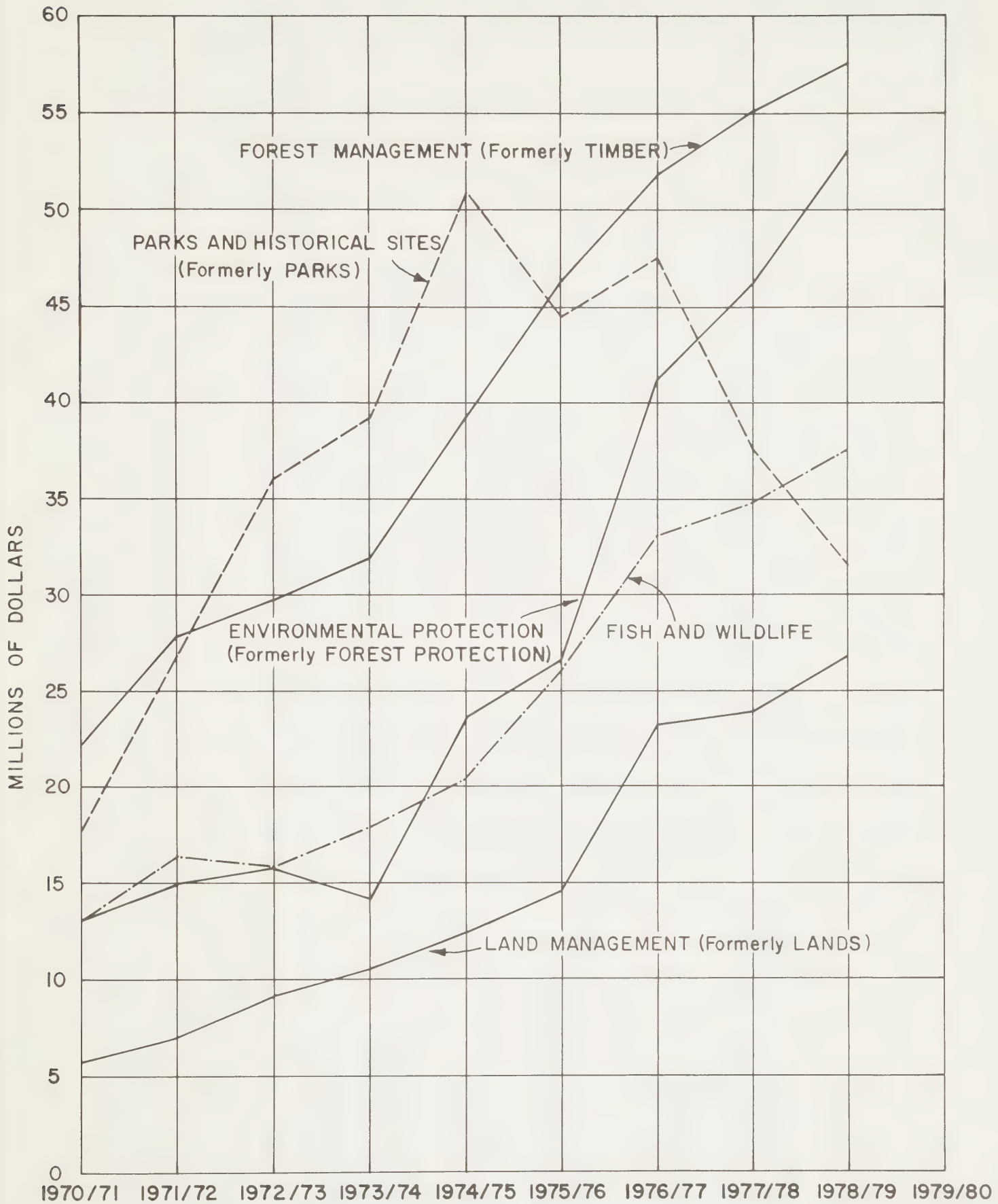


FIGURE 7. GROWTH OF ONTARIO MINISTRY OF NATURAL RESOURCES (FORMERLY DEPARTMENT OF LANDS AND FORESTS) EXPENDITURES

Source: Annual Reports, OMNR.

TABLE 33

FOREST MANAGEMENT EXPENDITURES, 1971-72 through 1978-79

(Million \$)

	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79
<u>Ministry Administration</u>	2.357	3.564	4.527	5.217	6.394	6.438	6.758	7.1
<u>Forest Resources Production</u>	20.209	20.672	21.006	24.905	31.413	36.741	43.220	49.708
<u>Forest Access Roads - Construction</u>	0.763	0.797	1.191)	2.362	2.378	2.857 ^(g)	2.634	2.343
<u>- Maintenance</u>	0.938	0.889	0.980)					
<u>Field Administration</u>	2.096	1.687	0.681	0.920	(a)	(a)	(a)	(a)
<u>Land Acquisition and Development</u>	0.071	0.364	0.251	0.032	0.001	0.034	0.020	0.015
<u>Others, Environmental Protection Service</u>	1.163	1.100	1.301	1.240	0.483	1.604	1.225	1.135
<u>Other Land Management</u>	1.096	2.731	2.103	3.529	5.693	4.222	4.553	3.948
<u>Less Federal Contributions/ Reimbursements of Expenditures</u>	-	-	-	(0.695)	(0.584)	(0.407)	(0.982)	(0.796)
<u>Total Forest Management Expenditures</u>	27.907	29.765	32.040	37.510	45.778	51.489	57.428	63.453

a) amounts included with respective activities

TABLE 34

ENVIRONMENTAL PROTECTION EXPENDITURES, 1971-72 through 1978-79
(Million \$)

	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79
<u>Forest Protection (e)</u>								
Extra Fire Fighting	9.790	9.651	9.932	11.090	14.975	14.375	14.187	10.937
Research	2.525	3.000	1.149	8.825	7.594	21.587	6.117	1.549
Ministry Administration (Pro-rated)	0.066	0.058						
Field Administration (Pro-rated)	1.105	1.743	2.205	3.191	3.709	4.966	5.488	6.456
Engineering Services	1.144	0.321	0.316	0.384				
Construction of Resource Access Roads	0.176	0.688	0.627					
Maintenance of Access Roads	0.011	0.016	0.045)	0.243	0.383	0.362	0.119	0.137
Geological Service, Shared-Exploration Costs and Land Surveys	0.170	0.136	0.139)					
	0.020	0.164	0.139					
Total Forest Protection Expenditures	15.006	15.786	14.233	23.733	26.661	41.290	25.076	18.705

TABLE 35

FOREST MANAGEMENT AND PROTECTION EXPENDITURES ASSIGNED TO THE TIMBER GROWING ACTIVITY
(Million \$)

Expenditures by Government	Proportion Assigned to Timber Growing	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79
Ministry Administration	100%	2,357	3,564	4,527	5,217	6,394	6,438	6,758	7,100
Forest Resources Production	100%	20,209	20,672	21,006	24,905	31,413	36,741	43,220	49,708
Forest Access Roads	25%	1,701	1,686	2,171	2,362	2,378	2,857	2,634	2,343
Field Administration	100%	0,425	0,422	0,543	0,591	0,595	0,714	0,659	0,586
Land Acquisition and Development	100%	2,096	1,687	0,681	0,920	-	-	-	-
All Protection	25%	0,071	0,364	0,251	0,032	0,001	0,034	0,020	0,015
Others	25%	0,071	0,364	0,251	0,032	0,001	0,034	0,020	0,015
Total Costs Assigned to Timber Growing		15,006	15,786	14,233	23,733	26,661	41,290	25,076	18,705
		3,752	3,947	3,558	5,933	6,665	10,323	6,269	4,676
		2,259	3,831	3,404	4,769	6,176	5,826	5,778	4,481
		0,565	0,958	0,851	1,192	1,544	1,457	1,445	1,120
		29,475	31,614	31,417	38,790	46,612	55,617	58,371	63,205

5.8 Direct Salaries, Wages, and Employment

The Forest Management and Environmental Protection activities of the Ontario Government tend to be rather labour intensive. The magnitude of the direct salary and wage payroll is separately indicated in Table 36, along with the direct employment in these activities. In 1978, these activities provided approximately 1,200 permanent jobs and about 1,700 man-years in casual and seasonal employment. The payroll for these activities in 1978 was in the order of \$39 million.

Additionally, of course, there is an indirect generation of employment and payrolls through the expenditure of contract funds for purchased services, such as consultant studies and the leasing of aircraft and heavy equipment. In conjunction with such contracts, operators and maintenance crews are normally supplied within the contract cost.

5.9 The Time Cost of Money and Indirect Public Expenditures

In all fairness to economic analysis, two major subjects need comment at this stage of the report. The first is the aspect of the time cost of money used in forest management expenditures or investments.

In the foregoing presentation and discussion, a simple annual expenditure and revenue (cash flow) picture is presented. Nothing is stated about the fact that the trees regenerating in any one year (expenditure) do not create any or very little government income (revenue) until they are harvested at maturity. Additional forest management or environmental protection costs may be incurred at any stage of the forest's rotation period. An analysis taking these factors into account (compounding to the future or discounting to the present) is extremely difficult and beyond the scope of this report. Forest management costs, interest rates, rotation periods, and species compositions are just some of the multitude of variables that would need to be examined. Let it suffice that we recognize this shortcoming and leave it for a future analysis.

The second aspects which needs to be elaborated for a more balanced approach is that only the direct government expenditures on forest management are presented in the foregoing. If we credit the forest industry with the generation of indirect employee income tax revenue, then likewise one should recognize the indirect costs incurred by different levels of government in the provision of services to the communities dependent upon their employment on the forest industry.

Many of these government services are social in nature. Education, health, protection and security, judiciary, and several others come to mind. Other services are more physical in nature, such as transportation and the maintenance of its systems, communications, recreation, etc. These indirect expenditures and more appropriately, that portion of their costs attributable to forest industry employees, should form a part of this analysis; but again, because of the difficulty in their measurement and appropriation, they are recognized, but foregone in this presentation.

TABLE 36
DIRECT SALARIES, WAGES, AND EMPLOYMENT IN
ONTARIO GOVERNMENT FOREST ACTIVITIES

Fiscal Year and Activity	Salaries and Wages (Million \$)	Employment	
		Permanent Staff (Man-years)	Casual Staff (Man-year equivalents)
<u>1977-78</u>			
Forest Management	27.9	793	1,486
Forest Protection	10.5	268	700
<u>1978-79</u>			
Forest Management	28.7	873	1,273
Forest Protection	10.1	292	472
<u>1979-80</u>			
Forest Management	31.5	908	1,275
Forest Protection	10.5	288	431

CHAPTER VI

SOME OBLIQUE INFLUENCES

The preceeding chapters have presented the major influences of the Ontario forest industry on the provincial economy. A number of lesser, but not insignificant, aspects are: private forest lands, forest access roads and recreation and tourism. A characteristic of all these topics is that the magnitude of the impact is somewhat more difficult to define.

6.1 Private Forest Land

The area of privately owned productive forest land in eastern Canada is presented in Table 37. More than 55 per cent of the productive forest land in the Maritime provinces is privately owned. By comparison, only 9 per cent of Ontario's forest land is privately owned. The area of productive forest land in private ownership is, however, a much more meaningful figure. Ontario's area of private, productive forest land substantially exceeds that of either New Brunswick or Nova Scotia. Approximately half of the Ontario private, productive forest lands are large holdings, owned by railway, forestry and mining companies.

Even though Ontario's private, productive forest land is only 9 per cent of total productive forest land by area, during the last two decades, Statistics Canada estimates it produced from a low of 16 per cent to a high of 39 per cent of Ontario's roundwood. Average production was 30 per cent and in 1978 it had declined to the low of 16 per cent. Ontario roundwood production is presented in Table 38 and is illustrated in Figure 1.

The high level of production for patented lands may be attributed to either higher harvesting and utilization levels or better growth. Most likely it is a combination of both. In comparison with most Crown lands that are geographically farther north, private lands often have a greater production potential and are often closer to markets.

The other half of private forest lands in Ontario are held in relatively small blocks, most operated as part of a farm enterprise. The economic importance of these farm woodlots was steadily declining until recently, when farm income from forest products stabilized in constant dollar terms. Farm income in Ontario derived from forest products for years 1973 to 1978 was:

TABLE 37

AREA OF PRODUCTIVE FOREST LAND

IN

EASTERN CANADA BY PROVINCE, 1978

(000 square miles)

Tenure	Ontario	Quebec ¹	New Brunswick	Nova Scotia	Newfound-land
Crown	203	155	11	4	127
Patent	19	14	14	12	3
Total	222	240	25	16	130
Patent land as % of total	9	n.a.	56	75	2

1. Crown/patent land distribution only for portion of Quebec that is inventoried, 79,000 square miles in total are not classified.

TABLE 38

ONTARIO ROUNDWOOD PRODUCTION

(Million cubic feet)

Year	Crown Land	Patented Land		Total
			per cent	
1958	295	188	39	483
1959	348	183	34	532
1960	347	194	36	541
1961	326	168	34	494
1962	346	174	33	520
1963	360	175	33	535
1964	376	194	34	570
1965	386	181	32	567
1966	423	177	29	601
1967	436	171	28	607
1968	396	195	33	591
1969	430	192	31	622
1970	396	197	33	593
1971	390	169	30	559
1972	444	169	28	613
1973	506	145	22	651
1974	513	153	23	666
1975	327	175	35	502
1976	464	127	21	591
1977	560	121	18	681
1978	578	135	19	713

Year	73	74	75	76	77	78
Million \$	5.8	6.0	7.4	8.0	8.8	10.5

In 1978, the area of farm woodlots was 4,400 square miles, about 2.0 per cent of all productive forest land in Ontario. This has decreased slightly from 2.2 per cent in 1971 and 3.1 per cent in 1966.

These statistics are, of course, incomplete. Many farms are now burning more fuelwood as energy prices continue to increase, and the amount of wood products from the farm woodlot that are utilized in the form of lumber and posts, etc., is unknown. Woodlots on farms also have indirect economic benefits in many ways, such as in windbreaks which, among other things, prevent soil erosion, crop damage and may reduce heating and air conditioning energy requirements for buildings.

6.2 Resource Access Roads

For persons only familiar with the highly populated and well developed southern fringe of Ontario, it is perhaps difficult to visualize the immense land areas that would be closed to vehicular traffic if the Province's extractive industries did not exist. The forest industry has been one of the great road builders into areas where none existed. The government and other resource industries are partners in this work. Table 39 illustrates the current distribution of roads by regions (see Figure 5) and by types. Included in this table are all roads constructed by industry that are open for general use.

Additionally there are estimated to be in excess of a thousand miles of road that are closed to the public for reasons of safety. These are shown in Table 40.

These figures are indicative of the forest industry's contribution to transportation and travel by road in all regions of the province. While no further effort is made to quantify the impact, one merely needs to reflect on our dependence on this mode of transportation in our way of life to realize that the contribution is of considerable importance.

6.3 Recreation and Tourism

While it is generally accepted that significant amounts of money are spent annually on recreation and vacations, there has been a great paucity of statistics on actual expenditures. Statistics Canada has begun to collect and compile some recreational and tourism statistics,

TABLE 39

AN INVENTORY OF ROADS IN ONTARIO, 1978

(Mileages by surface type)

Region	Surface Type	Highways	Tertiary, County and Regional Roads	Urban, Township and Other Roads	Total
North-western	Paved	1,906	23	641	2,570
	Gravel	432	165	3,470	4,067
	Other	0	0	343	343
	Sub-total	2,338	188	4,454	6,980
North-eastern	Paved	3,175	156	2,218	5,549
	Gravel	1,033	86	6,662	7,781
	Other	0	0	2,137	2,137
	Sub-total	4,208	242	11,017	15,467
Southern	Paved	7,078	10,467	19,381	36,896
	Gravel	12	1,951	33,594	35,557
	Other	0	31	5,952	5,983
	Sub-total	7,060	12,449	58,927	78,436
Province Total	Paved	12,129	10,646	22,240	45,015
	Gravel	1,477	2,202	43,726	47,405
	Other	0	31	3,432	8,463
	Sub-total	13,606	12,879	74,398	100,883

TABLE 40

FOREST ACCESS ROAD CONSTRUCTION AND MAINTENANCE

Year	Ministry of Natural Resources			Forest Industry		Total	
	Built	Improved	Maintained	Built	Main- tained	Built	Main- tained
1968	172	143	2,500	n.a.	n.a.	n.a.	n.a.
1971	115	25	3,500	317	6,780	438	10,280
1974	110	125	4,558	508	7,336	520	11,894
1977	379	251	11,097				

and various studies like TORPS (Tourism and Outdoor Recreation Planning Study) and CORDS (Canadian Outdoor Recreation Demand Study) have added much weight to previous demands for reliable statistics. In Ontario, a comprehensive study of recreation entitled the Ontario Recreation Survey has been published in 1977, based on surveys done during 1973-74. Along with this, the Crown Land Recreation Study was commissioned by the Ontario Ministry of Natural Resources and the results were also published in 1977. This study relied heavily on data obtained from the Ontario Recreation Survey but correlated information with other sources. No information of this nature is available on a regular, annual basis.

Direct expenditures on recreation for five Ministry of Natural Resources administrative regions are presented in Table 41. The expenditure in 1974 attributable to recreation on Crown lands and waters is \$249 million.

There is insufficient statistical basis for relating these expenditures to existing forest access roads or to the forest resource in general, but it may be assumed, since many recreational activities would be prohibitively expensive or impossible without access roads, that such roads do contribute substantially to the expenditures.

The major forest industry contribution to recreation is access to land or water, be it by roads currently designated as forest access roads, or by historical pioneering road construction to open up an area. Many forest management techniques enhance wildlife habitat and thereby augment wildlife populations and associated recreational and commercial tourism opportunities. As we have seen in Chapter 5, much government expenditure on recreation facilities, forest management and forest protection is generated by or as a result of forest industry activities.

The presence of the forest industry does provide the potential for some negative effects on recreation and tourism. There are some pollution problems and conflicts sometimes occur between campers, cottagers and back country travellers and the timber harvesting industry, but these conflicts are being minimized and eliminated where possible.

TABLE 41

DIRECT EXPENDITURE ON RECREATION OCCURRING ON

CROWN LAND IN SIX MINISTRY OF NATURAL RESOURCES ADMINISTRATIVE REGIONS, 1974

(Million \$)

Activity	North- western	North- central	Northern	North- eastern	Algonquin	Total
Boating	2.77	1.37	1.44	4.36	3.14	13.08
Canoeing	.64	.13	.20	.58	.71	2.26
Swimming	1.46	.89	.84	2.71	2.40	8.30
Hiking	.44	.66	1.21	2.34	1.55	6.20
Cross-country Skiing	.03	.08	.28	.39	.14	.92
Snowmobiling	1.62	1.26	2.16	4.46	1.57	11.07
Fishing	24.87	11.21	7.54	17.95	5.88	67.44
Camping	14.12	13.39	8.49	20.50	9.07	65.57
Cottaging	11.22	4.47	5.04	24.75	6.40	51.88
Big Game Hunting	2.16	3.28	3.70	3.49	1.99	14.62
Small Game Hunting	.20	.42	.76	2.06	1.22	4.66
Wildfowl Hunting	.19	.44	.50	.37	1.02	2.52
Total	59.73	37.61	32.15	83.96	35.11	248.56

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